

# This Week in The IRON AGE

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## Editorial

Successful Postwar Selling ..... 57

## Technical Articles

The Right and Wrong of Time Study Computation .....	60
Ford Biggest User of X-Ray .....	65
Resistance Welding in Aircraft .....	66
Protective Coatings for Aircraft Parts .....	72
Non-Ferrous Alloy Blanking Dies .....	74
New Equipment .....	81

## Features

News Front .....	59
Assembly Line .....	86
Washington .....	90
West Coast .....	94
Personals and Obituaries .....	98
Fatigue Cracks .....	100
Dear Editor .....	102
This Industrial Week .....	104
News of Industry .....	107

## News and Markets

Sheet Production Up .....	109
Midwest Manpower Shortage Serious .....	111
Machine Tool News .....	162
Non-Ferrous Metals News and Developments .....	166
Non-Ferrous Metals Prices; Scrap Prices .....	168
Iron and Steel Scrap News and Prices .....	170
Comparison of Prices by Year .....	172
Finished Iron and Steel Prices .....	174
NE Steel and Warehouse Prices .....	176
Semi-Finished and Tool Steel Prices .....	177
Steel Pipe and Tubing Prices .....	178
Wire Product Prices .....	179
Pig Iron and Coke Prices .....	180
Railroad Material and Stainless Steel Prices .....	181
Ferroalloy Prices .....	182

Index to Advertisers ..... 265

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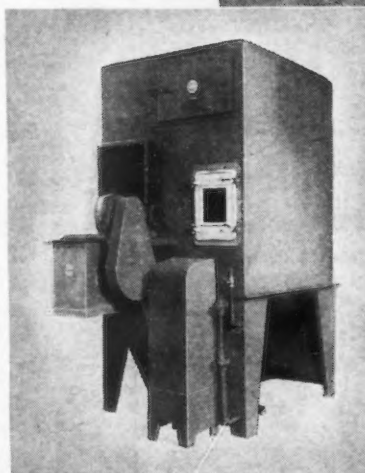
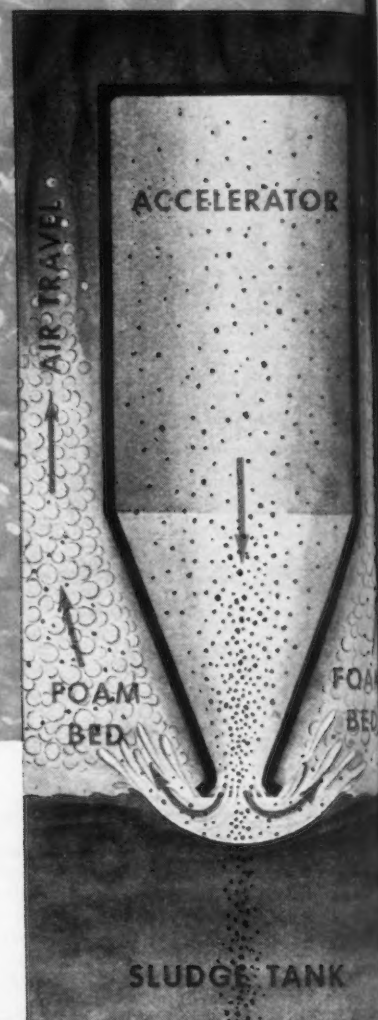


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# Successful Postwar Selling

WE have pretty well licked the problems of production. Given a product, however complex, and our engineers will tell us how to make it in the most economical and efficient way. What we will need after the war is someone to tell us how to sell it in similar fashion.

There is still plenty of slack to be taken out of sales and distribution. Perhaps we should be thankful for this condition for if it did not exist there would be no opportunity for improvement. At present we are in the same position with regard to merchandising and marketing as was the man who had all the bad habits and was thankful that he had so many things that he could give up if the necessity arose.

As I see it, there is going to be a strong trend towards specialized selling in the postwar days. It will be forced upon us from the standpoint of self-preservation. Also from the standpoint of reduction of sales costs.

Specialized selling is something like specialized medicine. Its practitioner must be an adept who knows more about his product than his customers or prospects do. That has not always been the case in the past, for too frequently machines, equipment and materials have been bought rather than sold. Bought because the user knows more about the product than the man attempting to sell it.

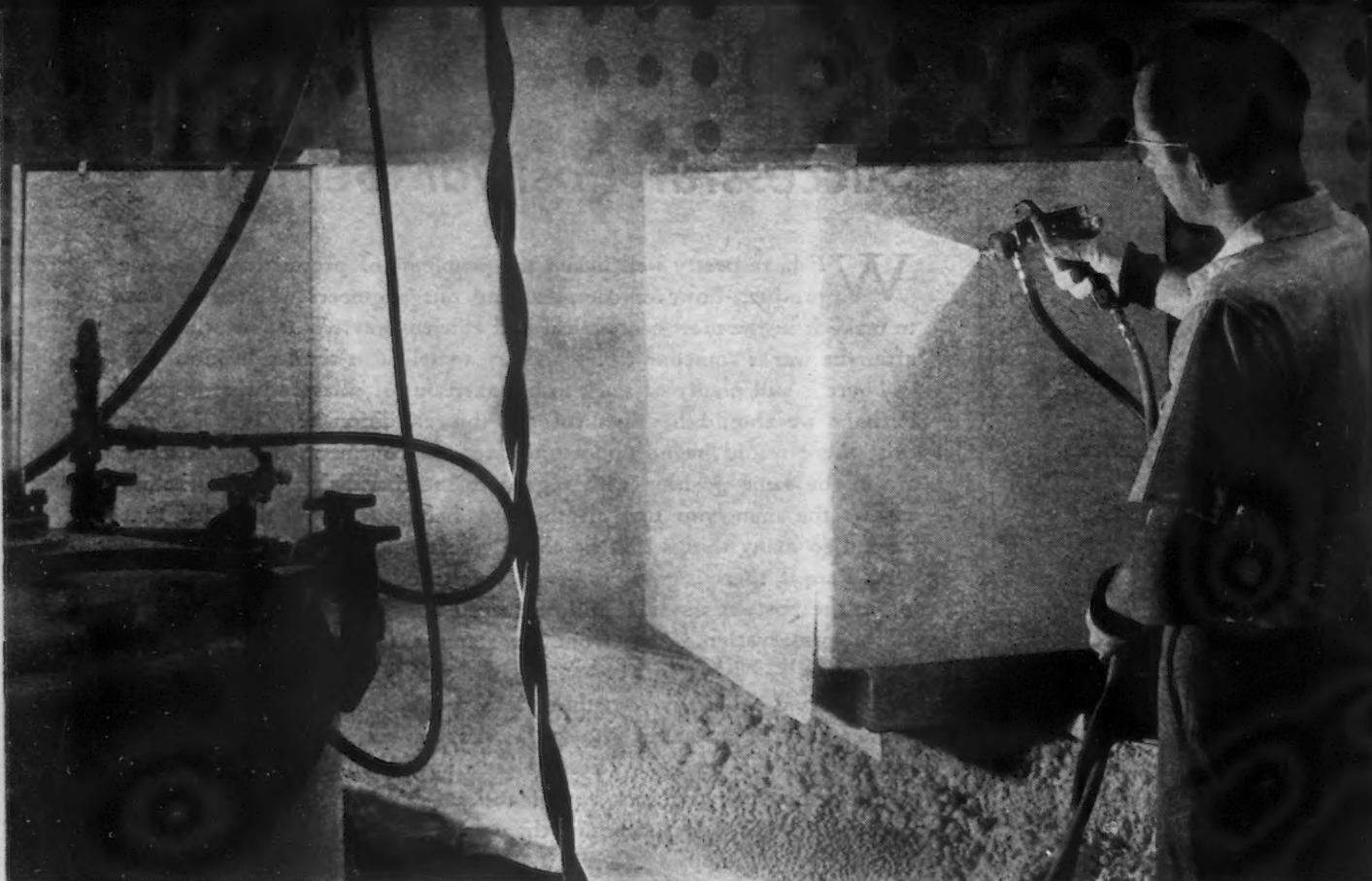
To be an adept and to know more about what one is selling than the customers and prospects, the salesman cannot attempt to be an "all around man." He must concentrate on fewer products and upon knowing *almost* all about them. That is quite a job because it is next to impossible for a man to know *all* even about such simple things as lead pencils or frying pans. No one, for example, has ever been able to tell me why they do not make rectangular frying pans which fit slices of bacon better than round ones.

To know almost all about the products that one has to sell is the first step. The second is to know almost all about the products that enter into competition with what one is going to try to sell. The third step is to determine the points of superiority of your product. The fourth is to learn how to express this superiority to the prospective customer.

But these things, in turn, are not enough. The super-salesman of tomorrow who is a specialist must also know nearly all about his prospects' needs with respect to the product he has to offer. Having this knowledge and that of his product and how it will serve these needs better than any competitors' product, our 1945-1946 model salesman will not have to read any books on sales technique in order to go to town. For if you are prepared to show a man who has a definite need that you can fulfill it better than anyone else, your sale is made before you ring his doorbell.

Most of the sales effort involved in this super-selling will be done at home, on the sales manager and on his staff, rather than on the customer. The sale is merely the terminal reached after laying the ties and the tracks. It's easy once you have laid the road bed.

*J. H. Van Deventer*



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► A large electrical company is developing an X-ray thickness gage for continuously checking sheet steel thickness as it comes hot from the rolls.

The device follows the pattern of Geiger-Mueller counting tubes used in Germany for measuring the thickness of forged cylinder walls. It employs an X-ray tube on one side of the swiftly moving hot steel sheet and on the other side an ionization chamber to measure the intensity of transmitted radiation.

► Open-pit quarrying of alunite ore at the Salt Lake City plant of Kalunite, Inc., has been closed down because of excessive stocks building up at Marysvale, Utah. This ore is refined at the Olin plant in Tacoma, Wash.

► Giant bombers now being used do not require the long runways that were anticipated. Instead of wheel brakes, reversible pitch propellers have been developed which brake the plane rapidly, easily and safely.

► Data on a tentative uniform method of specifying alloy steels by hardenability have been issued by the S.A.E. and the American Iron and Steel Institute. This new method springs from an engineering philosophy of selecting steels on the basis of hardenability as an index of tensile strength, with only corollary reference to chemical compositions.

The new data are applicable to 37 standard fine-grain steels, and include the 4100 series from 0.30 to 0.50 C; 4340; 4620; and the 8600 and 8700 series from 0.20 to 0.50 C. For other standard steels similar data are now being prepared.

► One of the earliest civilian industries to swing back into production will be that of sweepers. The Hoover Co., for instance, has for some months been busy in one factory at Canton rebuilding old sweepers. Another factory on an Ohio River island near Marietta is being equipped for the manufacture of new sweepers.

► To provide a heavier and better fighter than the P-39 Airacobra, the new Bell P-63 Kingcobra was developed. Although differing only slightly in appearance from its prototype, the P-63 is about 700 lb. heavier than the 7650 lb. P-39 and has a wing span of more than 38 ft.

Chief change is in the power plant. The P-63 has a two-stage Allison, 1500 hp engine which gives greatly increased power and speed over the single-stage Allison which powers the P-39. Service ceiling of the new plane is 35,000 ft.

► Although the general impression is that Army-Navy E's have been granted wholesale, only 3½ per cent of the nation's eligible plants have received the award in the two years since its institution. On the second anniversary of the presentation of the first award, Aug. 10, it was announced that the award had been granted to only 3097 plants.

► New emphasis on B-29 production and a military and naval project program reaching \$100,000,000 have created additional manpower difficulties for West Coast producers.

In a joint meeting between Army, Navy, business and labor representatives in Seattle, it was estimated that 37,000 workers are needed in the Puget Sound area immediately.

From the meeting emanated a program which specified that civilian construction and repair jobs must be postponed indefinitely and that direct war and military projects will be graded in seven brackets. Neither manpower officials nor labor organizations will supply workers to those in the second and lower brackets until the first is manned.

► Union factionalism has been responsible for the delay in settling the strikes at General Motors. Sentiment in favor of repealing the no-strike pledge at the UAW's convention next month is growing with Walter Reuther, Richard Leonard and Richard Frankenstein jockeying for the position of first vice-president.

► Postwar plans of Graham-Paige include in addition to automobiles, revival of farm tractor production which Graham began to make in 1941 and output of a line of farm implements to go with this tractor.

# The Right and Wrong Of Time Study Computations

**F**EW, if any, industrial engineers would dispute the statement that accuracy in computation, as well as precision in the measurement of time values, is absolutely essential to effective time study work. Yet the entire area of computation, including the application of allowances, the determination of the leveling factor, and much of the formularization which could be used to simplify time study work, has been relatively unexplored.

*For additional information on time study procedures, also see "Planned Time Study Standards," THE IRON AGE, Oct. 29, 1942, p. 34.*

While there have been a great number of texts written in recent years, most of the work done in the field has been directed towards the development of new methods or the refinement of existing methods, with the objective of increased accuracy in the measurement of time values. The need for exacting precision in the development of time standards for virtually every type of man and machine performance has been expounded by the leading engineers in the field. Precision has been emphasized to the extent of making micro-motion film analysis of the time values of elementary movements requiring 0.001 min., or less. This progress in measurement, however, has not been matched by an equal progress in the manipulation of the time values measured and their synthesis into time standards.

In many classes of work, startling as it may seem, the accepted methods of computation often result in serious errors in the determination of the final standard. For example, the widely accepted practice of adding allowances to selected job cycle times in order to take care of necessary operation delays, such as tool maintenance and tool change, clean up time, operator's personal allowances and fatigue, is arithmetically incorrect. The most widely used method of de-

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**... Although time study procedures are almost always preceded by precise measurements of time values, much of this work has been wasted by faulty allowances for personal and fatigue delays and machine maintenance. This article which will be followed by two others, "Simplified Time Study Computations" and "The Proper Determination of the Leveling Factor in Time Study," discusses accurate calculations and applications for correct time allowances that employees working under incentive systems can readily understand.**

termining the leveling factor is a relatively inflexible procedure and does not give sufficient consideration to the fact that the relative importance of the factors of skill and effort in determining job output are not always the same. On different jobs, these factors may each contribute a very different percentage to the effectiveness of the operator's performance. It may seem incredible that in the face of such exacting precision as has been demanded in time study technique, such looseness in the handling of time values, and in the computation and application of allowances should exist, but it is, nevertheless, true.

## Computation of Allowances

The present method of handling allowances as widely used in time study computations is as follows:

A study is made to determine the amount of necessary delays which are generally incurred on a particular job or class of work during an average day. These may cover oiling and warming up of equipment, sharpening or changing tools or cutters, clean up time, etc. Similar figures are established to cover productivity

losses as a result of fatigue. Each of these times is divided by the total working day to arrive at a percentage of allowance. By means of this method, tables of fixed percentages of allowances are established to cover personal allowances, fatigue allowances and unavoidable delays. This method has been described at quite some length in many recent texts\*

\* Barnes, "Motion and Time Study," pp. 272 and 285.

Schutt, "Time Study Engineering," p. 61.

Lowry, Maynard and Stegemerten, "Time and Motion Study," p. 252.

on time study technique, and is widely used in most time study procedures today. William H. Schutt, in his book "Time Study Engineering," goes into some detail in describing the normal manner in which allowances should be determined and applied. On page 61 of his book, he says,

"Determining Definite Time Allowance.—If the personal allowance should be a definite time, say 24 min. per 8 hr. day, and the fatigue allowance 48 min. per 8 hr. day, the first thing you must determine is what percentage of a day 24 min. is. We



are considering an 8 hr. day. We know there are 480 min. in that time. Therefore, 24 min. = 24/480 of a day which is 24 ÷ 480, or 5 per cent. What percentage is 48 min. by the same procedure?

$48/480 = 48 \div 480$ , or 10 per cent  
After the percentage is obtained, simply multiply the selected time by it in precisely the same manner as under Percentage Allowance."

In essence, the procedure used is simply this: The number of minutes to be allowed in each category is first determined and is then expressed as a percentage of the total working day. The allowance is then made by adding this per cent or these percentages to the effective working time (selected job cycle time).

It is intended to show in this article that:

(1) The method generally used in arriving at the percentage of allowance that is to be added to the normal working time, is incorrect; and that its use results in gross errors in the standards which are set.

(2) Even if the proper method were used in determining the percentage of allowance, this method of adding percentages to the normal working time is not desirable since its use results in the need for a different percentage to cover the same number of minutes of allowance in each class of work, and on many individual jobs within the same class.

(3) Another method, much simpler to understand, and to explain to employees on incentive programs, and more accurate, can easily be used.

In essence, the principal fallacy in the usual method of making allowances, which has just been described, is that since the effective or actual work time is always less than the total working day, a per cent computed on the total working day, and then applied to a much smaller part of the total working day, namely the effective or actual working time, is no longer equivalent to the number of minutes of allowance originally intended. This becomes plain when it is realized that the total working day is fixed, and the effective working part of the total working day varies, according to the number of minutes of allowance required on the job. Therefore, any fixed percentage of the total working day to this variable working time cannot be applied with a resulting fixed number of minutes of allowance. Thus, it can be seen that if the plant policy is to allow 30 min. per day for personal allowances on certain classes of work, then this 30 min. will always be a different percentage of the effective



**PRELIMINARY** to time study, job methods and setups are carefully analyzed and standardized with the cooperation of the foremen.

working time, depending on how much of the total working day the effective working time is. This will, of course, be different for every class of work. Regardless of the class of work or type of allowance, this logic holds true whenever a fixed number of minutes per day is expressed as a percentage of the working time.

If, in addition to the personal allowance, it is required to allow for certain delays, such as clean up time, or oiling or warming up of equipment, and for time lost through fatigue, the effective or actual working day is further reduced and the per cent that each of these allowances is of the actual working time, is further increased. The error, therefore, which would result from the use of a fixed percentage of allowances based on the total working day, would be larger.

The following extract from a study on semi-automatic equipment, one of many made in the Bulova shops will illustrate the extent to which many standards may be thrown off by the accepted methods of making allowances on the cycle or effective working time.

During the 9 hr. average working day, the following allowances were

made for a particular class of work:

Type of Allowance	Min. Per Day	Per Cent of 9 Hr.
Personal .....	27	5
Fatigue .....	54	10
Delays, handling, etc. ....	27	5
Tool maintenance, warm up, clean up, etc. ....	54	10
Total .....	162	30

The normal time per piece for the operation under study was 0.15 min. The generally accepted method of applying the allowance is as follows:

Selected time .....	0.150 min.
Allowance, 30 per cent. ....	0.045 min.
Standard time .....	0.195 min.

The hourly production is then computed:

$60 \text{ min.} \div 0.195 \text{ min.} = 307.2 \text{ pieces per hr.}$

This figure is now established as the task. The daily (9 hr.) production on this basis, would, therefore, be:  $307.2 \times 9 = 2764.8 \text{ pieces per day.}$

However, the correct computation should be:

$540 \text{ min. (total day)}$   
 $-162 \text{ min. (allowance)}$   
 $378 \text{ min. effective work time per 9 hr. day}$

The selected time is 0.15 min. To determine the daily production:

$378 \text{ effective working min.} \div 0.15 \text{ min.} = 2520 \text{ pieces per day.}$

The standard that would be set by the usual method of applying the

### Conversion of Per Cent Allowance on Cycle Time into Minutes per Hour, and Per Cent of Total Time

(This table may be used to determine the percentage of the total work day, and the number of minutes per hour which are actually allowed by percentages of allowance made on cycle time.)

Per Cent Allowance on Cycle Time	Per Cent Allowance on Total Time	Allowance in Minutes Per Hour	Per Cent Allowance on Cycle Time	Per Cent Allowance on Total Time	Allowance in Minutes Per Hour
1	0.99	.60	26	20.64	12.38
2	1.96	1.18	27	21.26	12.76
3	2.92	1.75	28	21.87	13.12
4	3.85	2.31	29	22.48	13.49
5	4.78	2.86	30	23.08	13.85
6	5.66	3.40	31	23.66	14.20
7	6.54	3.92	32	24.25	14.55
8	7.41	4.45	33	24.81	14.89
9	8.26	4.95	34	25.37	15.22
10	9.09	5.45	35	25.93	15.56
11	9.91	5.95	36	26.47	15.88
12	10.71	6.43	37	27.00	16.20
13	11.50	6.90	38	27.54	16.52
14	12.28	7.37	39	28.06	16.84
15	13.04	7.83	40	28.57	17.14
16	13.80	8.28	41	29.08	17.45
17	14.53	8.72	42	29.58	17.75
18	15.25	9.15	43	30.07	18.04
19	15.97	9.58	44	30.56	18.33
20	16.67	10.00	45	31.03	18.62
21	17.35	10.41	46	31.50	18.90
22	18.03	10.82	47	31.97	19.18
23	18.70	11.22	48	32.43	19.46
24	19.35	11.61	49	32.88	19.73
25	20.00	12.00	50	33.33	20.00

per cent of allowance (30 per cent) to the normal working time per piece (0.15 min.) would have been 2765 pieces per day, as against 2520 pieces per day, which is what the actual standard should be. In this case, the percentage of error would have been 9.7 per cent.

This error is sufficiently significant to upset the production schedule as

well as to wipe out most of the incentive possibilities on the job. This is, of course, especially true when dealing with equipment where the machine time is a major part of the total cycle, and, therefore, is to a large extent the controlling factor in limiting the rate of output.

It is important that the nature of the error be clearly seen. In the

case illustrated, the productive day is:

540 min. (total day)  
—162 min. (allowance)

378 min. (productive day)

This means that for each 378 min. of actual work, an additional 162 min. must be allowed. But when 30 per cent is arrived at by expressing 162 min. as a per cent of 540 min., and then add this per cent to 378 min., (which is actually done when adding it to the cycle time), 162 min. are no longer allowed, but only 125 min. In effect this means that for each 540 min. worked, 162 min. will be allowed. This, of course, is not what is intended. What is meant is that for each 540 min. of total work time on the job, 162 min. of non-productive time must be allowed. To express this as an allowance on the productive time, the computation must be based on the formularization:

162 min. allowance time = 42.9 per cent  
378 min. effective work time

The result of the incorrect computation of the standard by the use of improperly computed cycle time allowances will be to raise havoc with the standards in the factory, as it violates one of the cardinal principles of time study engineering—that is, consistency. One of the unique characteristics of the usual method of establishing a fixed percentage of cycle time allowances, is that the error it creates in the standard is small on those operations which call for a relatively small allowance, and very significant on those operations requiring a large allowance.

In order to clarify this, assume that there are two operations, each having a work cycle time of 0.20 min. One is a bench operation requiring a 27 min. allowance for personal needs, and a 54 min. allowance for fatigue, per 9 hr. day. The other is a fine tapping job on a multiple spindle tapping machine, requiring in addition to the 27 min. allowance for personal needs and 54 min. for fatigue, an additional allowance of 81 min. for machine warm up, daily cleaning and oiling, and change of taps which break. The usual allowance on cycle time method would involve the following:

	Bench Operation	Semi-Automatic Tapping
Work day, min. ....	540	540
Personal and fatigue, min. ....	81	81
Tool maintenance, etc., min. ....		81
Percentage of work day allowed .....	15	30
Selected job cycle time, min. ....	0.20	0.20
Allowance (15%) ....	0.03 (80%)	0.06
Standard time .....	0.23	0.26
Hourly production .....	261	281
Production per 9 hr. day. ....	2350	2079

### Standard Allowances Per 9 Hr. (In Min.) Semi-Automatic Equipment

	Standard Productive Minutes Per Hour	Personal	Fatigue and Consistency	Clean up and Oil	Tool Care and Maintenance	Delays	Total
Auto-drill and co-bore .....	46.0	27	24	20	40	15	126
Profiling .....	42.8	27	27	40	45	15	154
Engraving .....	48.3	27	24	15	25	15	106
Spiral drill .....	44.5	27	24	24	50	15	140
Profiling .....	48.3	27	24	20	20	15	106
Milling .....	46.0	27	24	20	40	15	126
Turning .....	45.5	27	24	30	35	15	131
Drilling .....	45.5	27	24	25	40	15	131



The correct standard should actually be:

	Bench Operation	Semi- Automatic Tapping
Work day, min. ....	540	540
Personal and fatigue, min. 81	81	81
Tool maintenance, etc., min. ....		81
Effective work day, min. 459	459	378
Selected job cycle time, min. ....	0.20	0.20
Production per 9 hr. day 2295		1890
Error in standard		
2.4 per cent bench operation		
10 per cent, semi-automatic tapping operation.		

Thus, the effect of this is to reduce almost to negligible the incentive possibilities on the operations

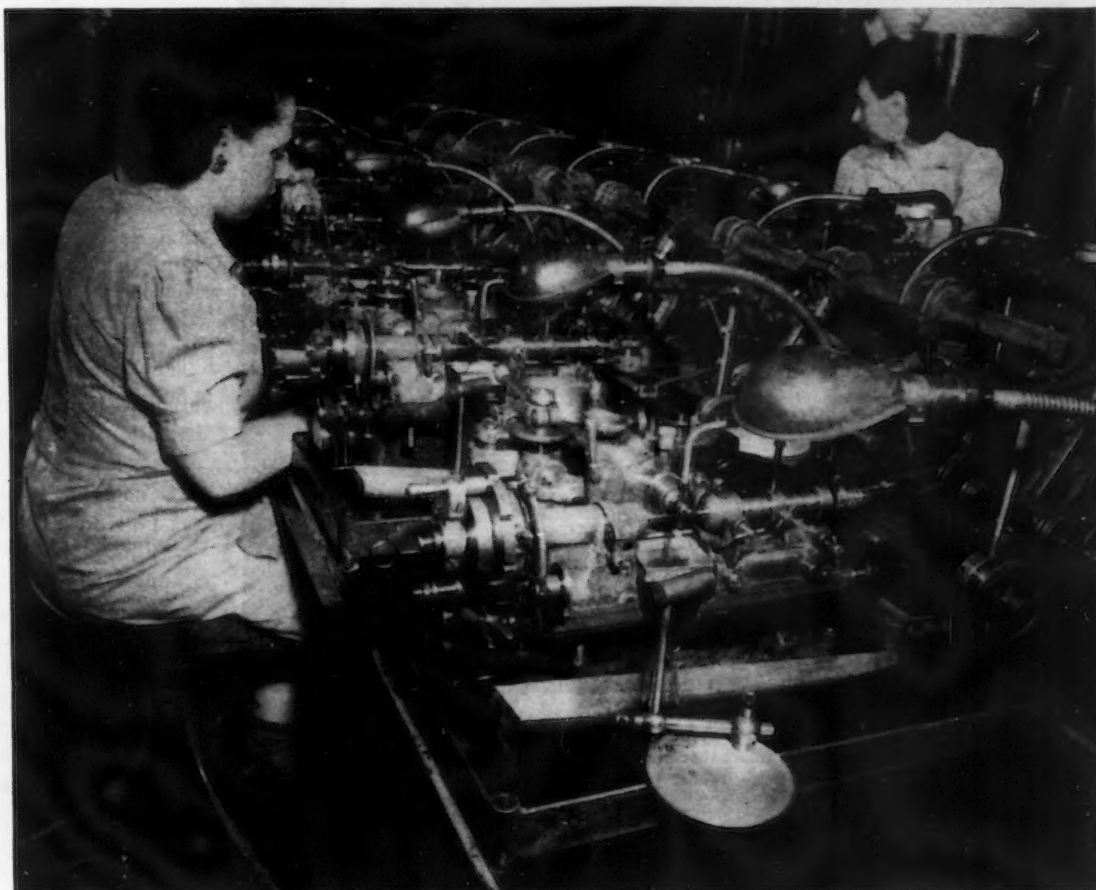
have been drawn so far, it is obvious that those individual firms and management consultant organizations who have gone to the extent of preparing elaborate fixed percentage charts covering personal and fatigue allowances to be made on cycle time, have based their work on a very fallacious premise.

The surprising element in this entire situation is that this fallacy in the determination and application of allowances should not have been uncovered before. From time to time,

used at present, with some minor variations; but the same error is inherent in the computations. The basic fact which seems to have been missed by those who have examined the present method of determining allowances is that no fixed number of minutes of allowance can be expressed as a fixed percentage, if this percentage is to be applied to a varying work time.

It is interesting to note that in several instances, so unquestioningly has the usual practice of making allow-

**E**ACH operator runs 10 to 15 machines in this battery of high precision millers. The allowances required are usually high and call for very careful treatment.



that generally most need them—the operation of machine batteries and equipment having a high per cent of down time such as multiple spindle, drilling, counterboring and tapping machines, and others of that class. Here the incentive possibility is usually limited to a fixed machine speed, and if the operator must first have to overcome the disadvantage of a time study error before reaching incentive earnings, the chance of real incentive is limited. On small machine or hand operations, on the other hand, where the allowance is usually no greater than 15 to 20 per cent, the error is not great, and the operator can usually reach high incentive levels.

Reviewing the conclusions that

there seems to have been some realization in the field, that the present method of calculating allowances is not all that it should be. As recently as last year, the United Electrical Radio & Machine Workers of America, one of the largest industrial unions to accept time study as a basis for incentive systems, made a survey of time study methods. In a booklet prepared for its membership, the union seems to express some awareness of the fact that the current method of making allowances is defective, and on page 66 of the booklet, an attempt to outline a slightly different procedure for applying allowances was made. However, the method which they recommended is essentially the same method being

ances been accepted, that in some texts the data are presented in such a manner that the author arrives at the correct computations, but realizing that the standards which would be set on these figures are different from the ones which would be set by the generally used method, proceeds to reject the correct answer and recommend that the computations be made in the usual manner.\*

\* William H. Schutt, "Time Study Engineering," p 376.

Barnes, who has made some very excellent contributions in the field of motion analysis and time measurement, in his book, "Motion and Time Study," on pages 278 and 285, outlines the usual method of determin-

ing allowances. Through the error thus created in the standards which would be established by this procedure, he negates many of the advantages derived through his extremely accurate methods of time measurement.

#### Determining Allowances

There are, of course, several simple ways in which allowances can be made on the work time, and still be

allowances, it has been found that the following method is sufficiently flexible to cover most conditions. The method itself is extremely simple to execute, and is based on the fact that on every job, the standard which is set simply calls for a certain normal (leveled) rate of effort and skill for a fixed number of minutes per hour. The number of minutes of effort required is simply the total hour (60

min. In order to prorate this over a day:

$$\begin{array}{r} 378 \text{ min. effective work time} \\ 540 \text{ min. total working day} \times 60 \\ \hline \text{min.} = 42 \text{ Standard min. per hr.} \\ \text{(SMH)} \end{array}$$

The selected job cycle time on this operation is 0.20 min. The hourly task, is, therefore,

$$\frac{42}{0.20} = 210 \text{ pieces per hr.}$$

#### Selling the Standard

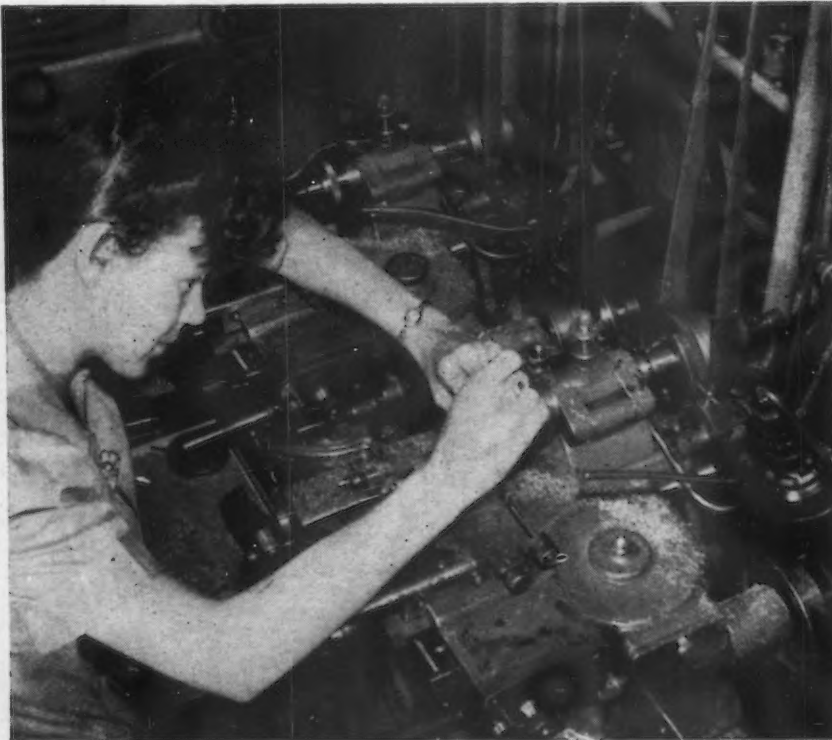
At Bulova, where 90 per cent of the production employees are working under an incentive system, it has been found that this method of applying allowances has several important advantages in addition to its accuracy. In explaining time study standards to employees, it is much more effective to show an employee that he or she has been allowed 120 min. per day, rather than tell her she has been given a 25 per cent allowance on the selected job time. Having allowance in minutes makes a very definite impression in the mind of the operator and helps make it easier to sell the standard to the employees.

It has been found very effective to set up allowance charts such as the one illustrated herein in order to both standardize and dramatize allowances.

Having allowances available in this form for presentation provides a quick and effective answer to the question asked frequently by operators being placed under standard: "What do you think I am? A robot!" The operator is able to visualize in terms of minutes per day the amount of time available to her for the various factors allowed. The time study engineer in making this explanation can then point out to the operator, the incentive possibilities of the job that are inherent in the allowances themselves, exclusive of any incentive that may be earned through an increase in speed or skill.

The standard minutes per hour which is set up as a base for computing production is a constant reminder to the foreman that the effective work time in his department is far less than the available time and a constant challenge to his ingenuity to eliminate as far as possible all job interferences.

Finally, a simple and uniform scale of allowance can easily be established, doing away with numerous complex charts that often cause confusion and misunderstanding.



**A** SET of high precision finish turning machines using 6 diamond cutters, all holding tolerances to 0.0004 in.

correct. However, there are many disadvantages inherent in the use of this method. Correctly applied, allowances on cycle time would often require the use of a different percentage to cover the same number of minutes of allowance, depending on the amount of total allowance made. This condition is extremely difficult to explain to employees on an incentive system, and makes the task of the time study engineer, who is anxious to enlist the cooperation of employees working under standards, even more difficult. It is no easy task to explain to two different operators why one of them should have a 5 per cent allowance to cover her personal needs, and the other a 9 per cent allowance, even though both percentages cover the same number of minutes of personal allowance. In order to overcome the ambiguities and difficulties involved in using cycle time

min.), less the allowance. This is called the "standard productive minutes per hour."

In computing allowances by this method, the total number of minutes to be allowed is first determined. This number of minutes is then subtracted from the number of minutes in the total working day. The remaining time is the effective work time. In order to prorate the effective working time over the entire day, the following computation can be made in one setting of the slide rule:

$$\begin{array}{r} \text{Effective work time} \\ \text{Total work time} \times 60 \text{ min.} = \\ \hline \text{Standard minutes per hour.} \end{array}$$

For example, in the first sample study illustrated, the required amount of allowance was 162 min. per day, and the effective work time was 378



# Ford Biggest User of X-Ray . . .

**O**F all the war plants throughout the country, Ford is the No. 1 user of X-ray industrial equipment, providing radiation at voltages from 5000 to 1,000,000. Today 16 General Electric X-ray industrial units are inspecting thousands of different parts for war equipment, including those for the B-24 Liberator bomber which is now coming off Willow Run assembly lines at the rate of one an hour. More than 125 persons are employed in the various Ford X-ray departments and the company maintains an apprentice training school to teach civilian operators how

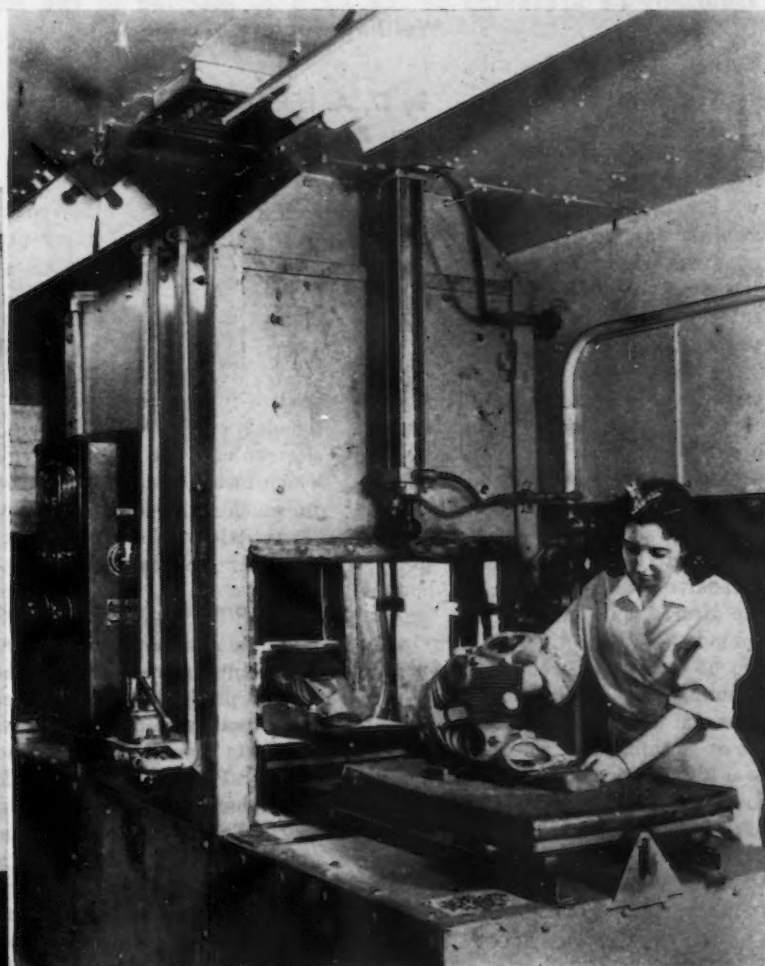
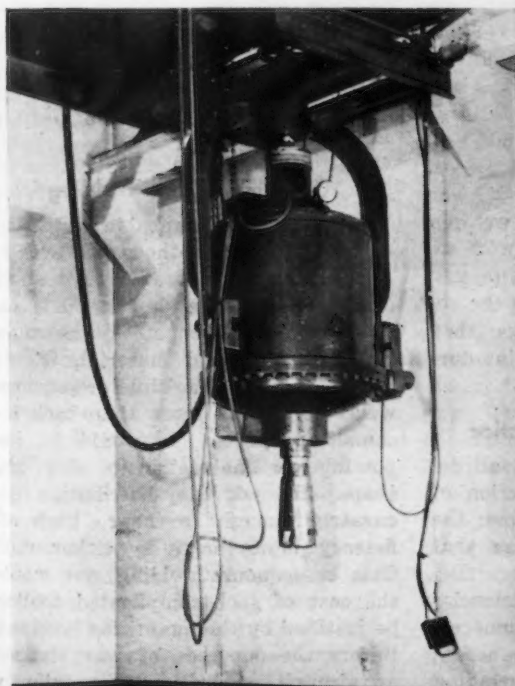
to handle X-ray equipment and process films.

Ford has two G-E million-volt industrial X-ray units which routinely inspect in 16 min. the same number of steel parts that required 60 hr. with low-powered apparatus. One of these units is in the \$27,000,000 aircraft engine building at the River Rouge plant, which has been turning out 2000 hp. Pratt & Whitney engines and the other, pictured, is in the new steel foundry. The million-volt unit at the aircraft engine plant is used to X-ray heavy steel castings, turbosupercharger parts and a wide assortment of bomber and glider castings.



## BELOW

**T**HE million-volt X-ray unit in the steel foundry is used to examine cast crankshafts for the Ford 500-hp. tank engine and also heavy castings for the M-8 light armored car. Two specially built flat cars, with a lead covered deck about 8 ft. square, are used to carry a large number of prepared castings into the X-ray room for exposure. During exposure the other flat car is reloaded with castings and the necessary films and markers.



**I**N the Ford electric furnace building a 400,000-volt G-E X-ray unit is used for the examination of heavy steel and alloy castings for the B-24 bombers. At top right, centrifugally cast pivot hinges for the landing gear of the plane are shown being radiographed four at a time from two different angles. The castings are placed manually on a specially constructed cart having four individual sections which can be tilted at any desired angle. When the castings are in place the lead-lined doors are closed and the X-ray pictures made.

**T**WO 140,000-volt X-ray units are used in the Ford aluminum foundry to radiograph repair welds on cylinder heads for the Pratt & Whitney engine. The exposure is made in lead-lined steel cabinets, which are about 8 ft. long and 6 ft. high. Pneumatically-operated doors are closed during the exposure to protect the workers. While the exposure is being made, the technician prepares another cylinder head for examination.

# Resistance Welding In Aircraft

**... The Douglas Aircraft Co. has speeded production by developing multiple spotwelders for the tack assembly of stainless steel ammunition boxes and chutes, and an index spotwelder for landing flap deflectors. Collet type dies have been developed for the concentric alinement of tubing for flash welding. This article is substantially as presented at the April 20 meeting of the American Welding Society.**

**I**N view of the fact that resistance welding was already a well developed science at the time the aircraft industry became interested in its possible applications in aircraft fabrication, it may seem presumptuous for the aircraft industry to boast about "new" developments and production methods. Although the application of resistance welding in aircraft has during the past 10 years increased from nothing to its present extensive use by leaps and bounds, the aircraft industry today is lagging behind the automotive industry in the use of resistance welding for accomplishing mass production. Thus it is apparent that we have developed little or nothing that would be of value to a highly developed mass production industry. Rather, we have arrived at our present limited mass production by refining old methods to make them fit the vastly greater quality requirements of the aircraft industry.

Likewise, it is apparent to those who have been involved in the development of methods used in aircraft production resistance welding, that although the automotive industry had already developed equipment and methods to a high degree for its applications, such development was soon found to be of negligible value to the aircraft industry. The few who have been in the aircraft industry since the first resistance welding applica-

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o o o

novices in aircraft resistance welding see only the present highly refined, electronically controlled equipment, which owes its development to the requirements of aircraft; thus they know little of the growing pains during early development.

## Automotive Welding Practice

In the automotive industry, all developments were in the direction of greater production at lower cost; the main quality requirement was that the parts should hold together. Design for 100 per cent joint efficiencies was unheard of and wholly unnecessary. The only material was steel, and the use of lead, putty, grinding and paint made even the surface appearance after welding a matter of little consequence. As steel has a very wide plastic range, almost any combination of current, pressure and time will make a weld which will meet the low quality and strength requirements of the automotive industry. In contrast, the requirements of aircraft are so exacting that, not only is automotive resistance welding equipment unusable, but personnel who have trained on that type of equipment used in the automotive

tions were tried can fully understand the reasons why what appeared to be a going process hit so many snags before it could be safely and economically used on aircraft. The

industry require additional training before attempting aircraft work.

In addition to the immense advantage of comparatively low strength and quality requirements, the automotive industry also had the huge quantity production demands which make special tooling not only economical but absolutely necessary. The cost, spread over millions of units, was a small item compared to the savings in man hours. Very large sums of money were spent each year to develop automatic multiple or sequence welders which would completely spotweld or flashweld, within one minute, an entire automobile body or chassis.

## Limited to Tack Welding

It is highly improbable that such mass production methods will ever be applicable in aircraft production; even if the future ship is made entirely of stainless steel, the most favorable spotweld material, it will be unsafe to use multiple or sequence weld tooling for more than tack assembly purposes. It would be impossible to maintain tip size and shape, and current distribution accurately enough to insure high efficiency joints made by either multiple or sequence welding, nor would the cost of such complicated tooling be justified by the quantities involved. Before the demands of war stepped up aircraft production to previously unheard of levels the only spotweld tooling used was that required to hold contours while tacking, and to hold dimensions of parts for interchangeability. Relatively no tooling costs were incurred merely for the purpose of saving labor hours; such tools were expensive and labor was at that time both plentiful and cheap.

## 18-8 Best for Multiple Welding

Tests made at the Douglas El Segundo Plant early in 1934 led to a conclusion that series or multiple



spotwelds in aluminum alloys could not be produced to meet consistency requirements. With an alloy which has an extremely short plastic range and low resistance, imperceptible variations in electrode contour, pressures and surface resistance are enough to disturb the current distribution so that one of two weld joints may be heated below the plastic range and fail to weld, while the other may be heated above the range and blow out. Any series or parallel spotwelding of aluminum alloys will produce a very high percentage of duds. For this reason, as well as the huge current values required for a single spotweld, multiple tack welding of this material

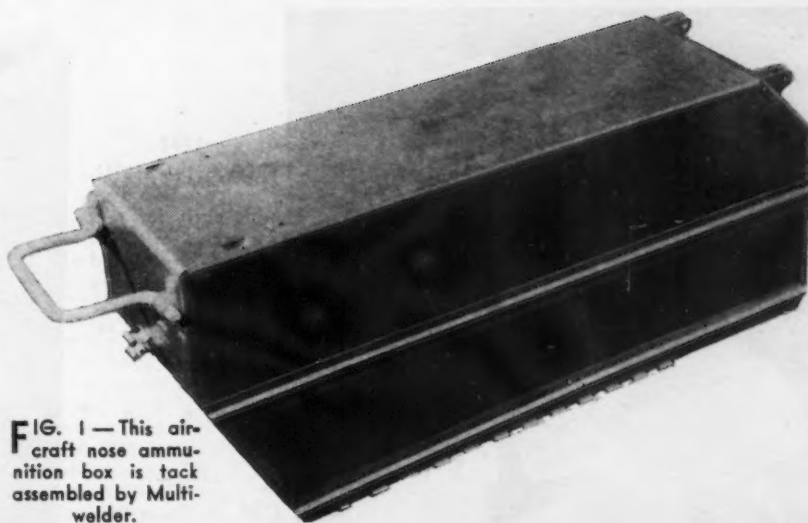
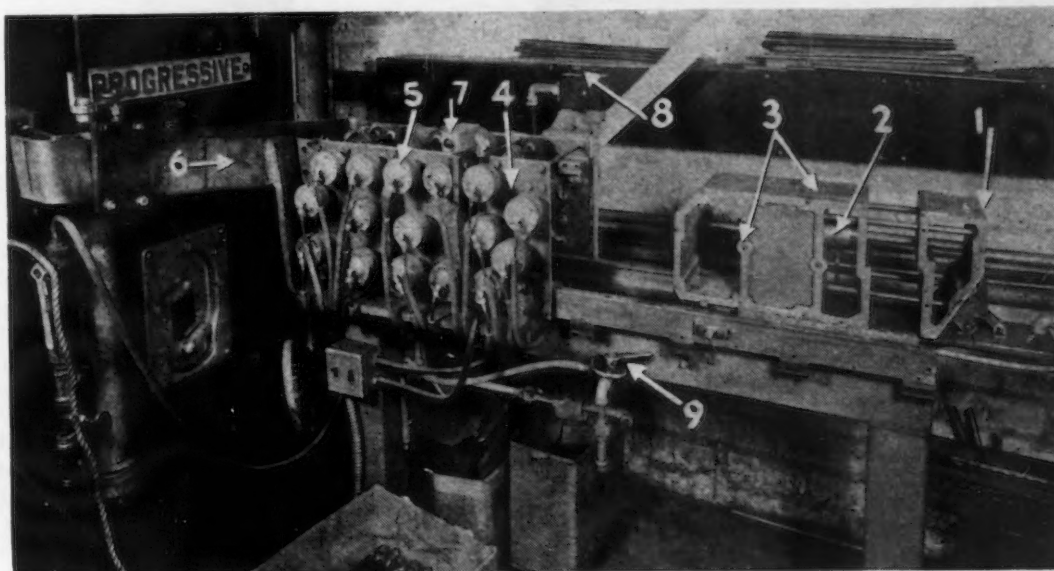


FIG. 1—This aircraft nose ammunition box is tack assembled by Multiwelder.

FIG. 2—Shown in this Multiwelder for the nose ammunition box are: 1—Cast aluminum alloy core expanded to load parts; 2—air cylinder to expand and collapse core; 3—series-conductor bars made of Mallory No. 3; 4—reaction and conductor plates of copper; 5—unit air cylinders to bring electrodes in contact with the work; 6—copper bus bars from the welding transformer; 7—push button for welding impulse; 8—pressure switch; 9—four-way air valve.



is impractical. 18-8 stainless steel, which has an electrical resistivity eighteen times that of dural, and has the wide plastic range of steel, offers the best possibilities for multiple welding.

Early in 1941 the El Segundo Douglas plant was committed to the mass production of 1000 A-20 bomber nose assemblies. Two stainless steel ammunition boxes, Fig. 1, were to be installed in each nose, and half again as many spares had been ordered. A total of 3000 of this item offered the first opportunity to justify the cost of tooling on a mass production basis.

#### Tack Assembly by Multiwelding

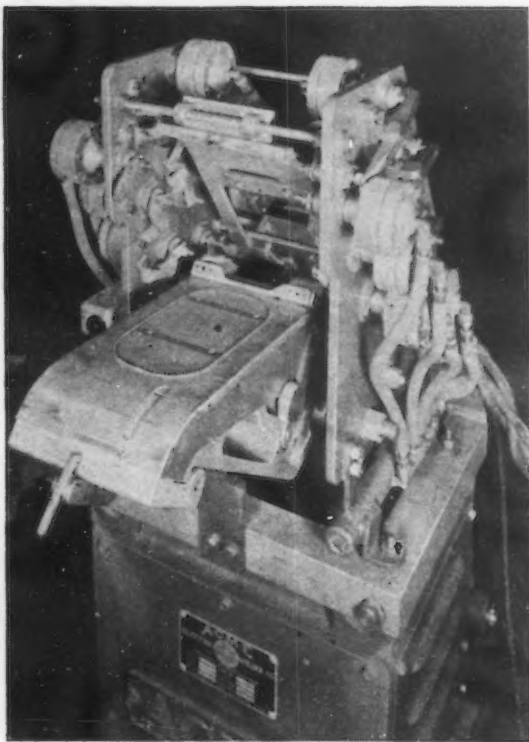
Preliminary tests showed that with uniform electrode pressures and current distribution, 27 spots made in parallel were all of sufficient uniformity and strength for tacking purposes. On the evidence of the test samples, approval was obtained for the design and construction of the first "Multiwelder." This machine was to serve

as a guinea pig to determine possible future application of this type of assembly tooling. The design was based upon the practical consideration of accomplishing the greatest time-saving possible without excessive tooling expenditure. A time study showed conclusively that the jig tack weld assembly time was 75 to 85 per cent of the total spotwelding time on equivalent assemblies; therefore, the greatest time-saving could be accomplished at minimum tooling cost by designing the Multiwelder to make simultaneous tack welds at the minimum number of locations required to make a rigid and accurate assembly. The small time required for "sewing up" the tacked assembly on automatic repeat spotwelders made it impractical to accomplish more than tack assembly in the Multiwelder.

In the resulting Multiwelder, Fig. 2, seven detail parts were simultaneously tacked together at 28 points by means of two sets of 14 oppositely placed, parallel-series connected electrodes.



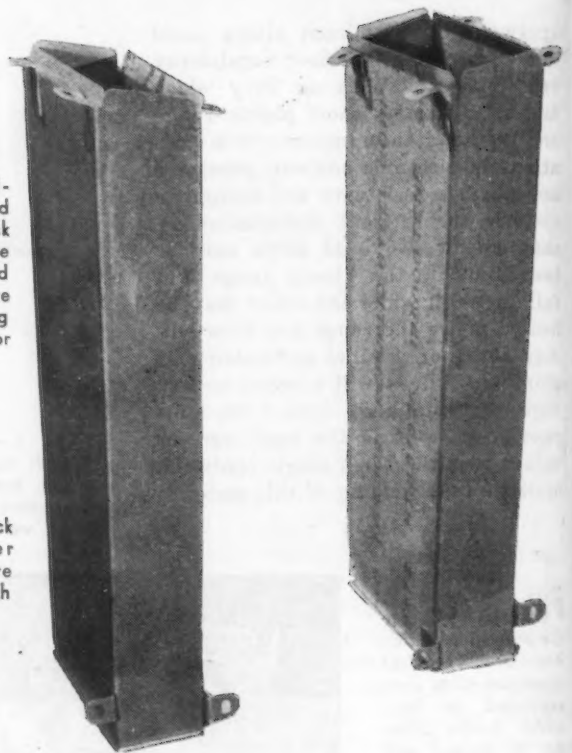
FIG. 3—Nose ammunition feed chute after welding. Only 18 spots are required for tack assembly.



LEFT  
FIG. 4—Multiwelder loaded with parts for tack assembly of nose ammunition feed chute. Loaded core is ready to swing into position for welding.

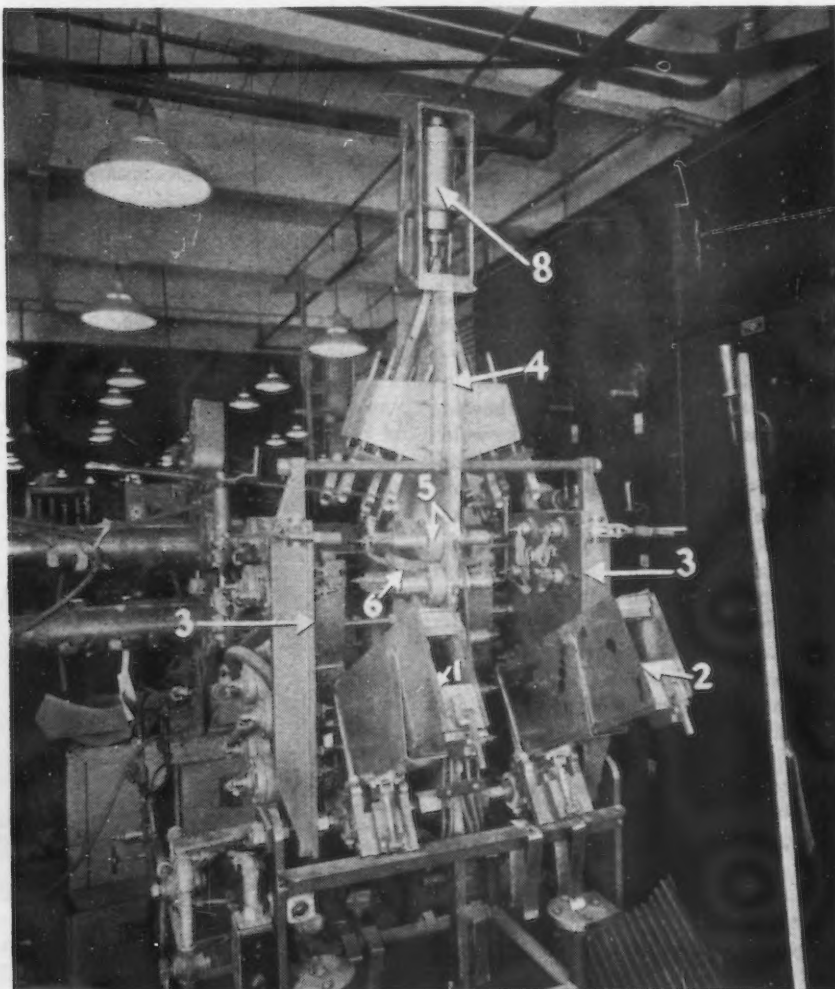
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RIGHT  
FIG. 5—These tack welded center ejection chutes are ready for finish welding.



#### BELOW

FIG. 6—The cores are loaded and ready to swing into position for tack welding on this dual Multiwelder for the ejection chute, showing: 1 and 2—Assembly cores expanded for loading; 3—reaction and conductor plates; 4—insulated center reaction plate; 5—center plate, dual, oppositely expanding air cylinders; 6—flexible copper series-conductor between dual cylinder electrodes; 7—spring clips to hold chute mounting clips in place for tack welding; 8—air cylinder for operation of clip locating holders.



The Multiwelder is essentially a "charged fixture." The two reaction plates which support the unit electrode cylinders are made of heavy copper plate and also act as bus bars for current distribution to the electrodes. Mallory No. 3 alloy electrodes, with Elkonite inserts, are screwed onto the air cylinder piston ends, and connected electrically to the charged reaction plates by means of flexible braided copper leads. The unit air cylinder is a 3 in. diameter neoprene diaphragm type which gives 175 lb. electrode pressure on a 90 lb. air line. All cylinders are commonly manifolded so that electrode pressures will be equalized.

The rigid cast aluminum core is accurately sized to the minus side of dimensional tolerances to allow use of all details within the tolerance range. It is designed to roll or swing between the reaction plates for welding after detail parts are loaded on it in the open. Bars of Mallory No. 3 alloy pass through the core between oppositely located unit cylinder electrodes, to serve as anvils for these electrodes, as well as conductors to place them in series. In each series electrode circuit, the current passes from one electrode through an interface to the Mallory anvil and out the other interface to the oppositely placed electrode; thus making two welds in series at symmetrical points on the assembly being tack welded. All these series electrode circuits are paralleled by common connection of the air operated electrodes on each reaction plate. After applied air



pressure brings all electrodes in contact with the work, one timed impulse makes all tack welds simultaneously.

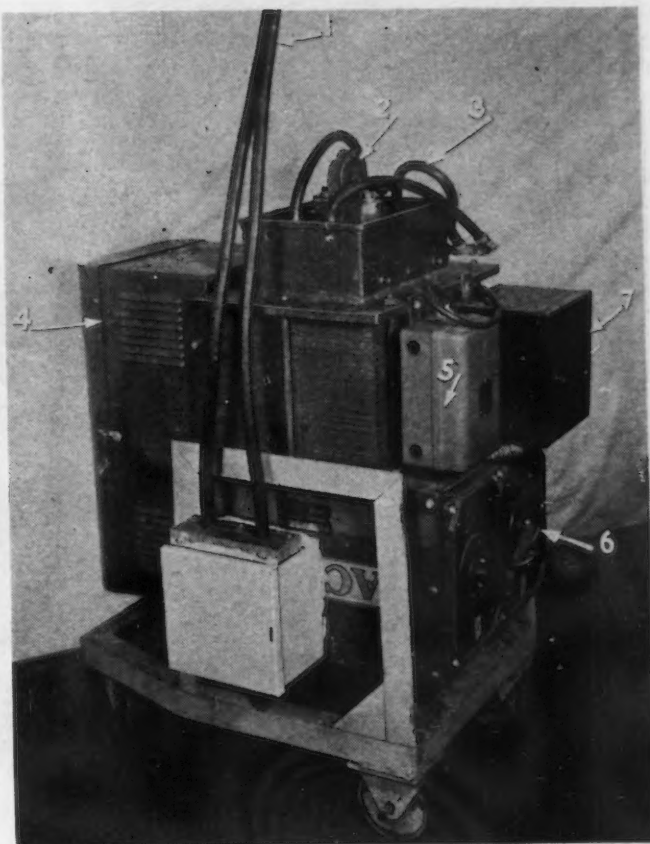
### Rate of Production

One operator was able to turn out 40 tack weld assemblies per hour. A comparable job, then being made on conventional tooling, required two men to produce three boxes per hour. No two of these conventionally produced boxes were identical, while all boxes produced on the Multiwelder were identical and interchangeable.

As men were lost to the military forces and women were used for replacements, the Multiwelder tooling was extended to include any stainless steel assembly which had the necessary production quantity or the requirement of interchangeability. Additional 18-8 parts, and Multiwelders developed for their production are to be seen in Figs. 3 to 6. Quantities of assemblies hitherto impossible were produced by inexperienced women operators who seemed to like and readily fit into this type of assembly work.

Labor-savings resulting from this tooling run as high as 80 per cent. In practice it has been found that one 75 kva. transformer mounted on wheels and rolled from one Multiwelder to another will take care of six or eight because of the high rate of production. This 75 kva. transformer, Fig. 7, will supply enough current to make 48 simultaneous parallel spots. If low-carbon steel were substituted for 18-8, this would be cut to about 20. Because of the results shown by the Multiwelders, the Douglas plant was allowed to continue using 18-8 stainless steel even

FIG. 7—This portable 75 kva. transformer shows: 1—Primary power leads; 2—secondary pads; 3—water cooling ducts; 4—magnetic switch; 5—electronic timer; 6—heat controls; 7—transformer, 24 volt, and relay for push button control.



during the most critical shortage of that material.

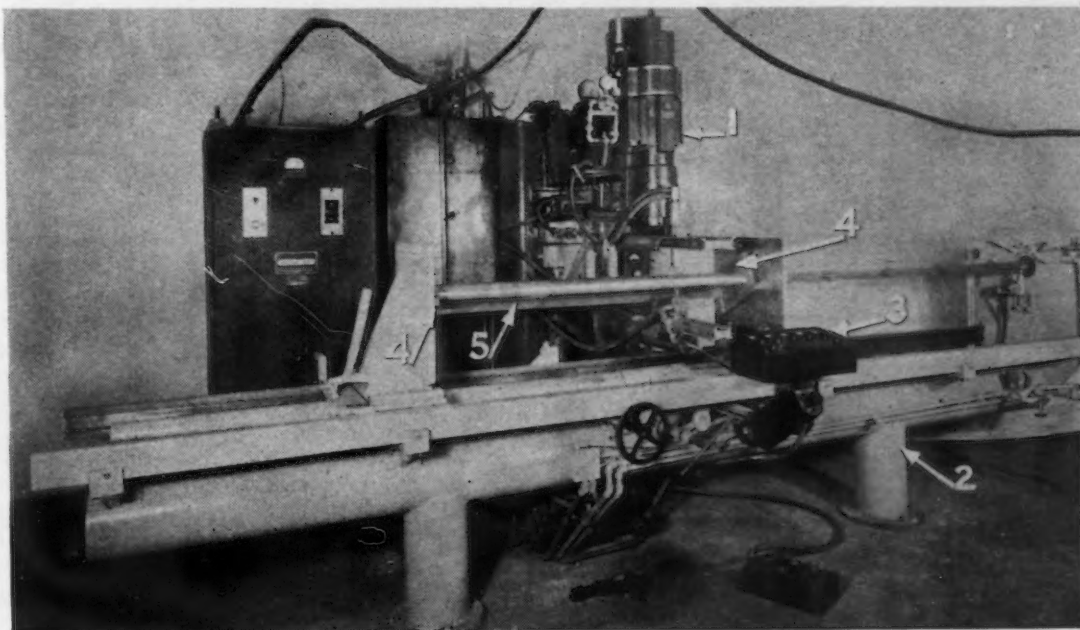
### Index Machine for Spot Welding

Another Douglas development in spotweld tooling is an index machine which spotwelds a heavy channel and "Z" stiffener on the inside of a tear drop shaped landing flap deflector. The deflector assemblies are from 4 to 5½ ft. in length, have a section of 1½ to 2 in. on the lines of spot welds and are only accessible through

the open ends. The small section and great length make it impossible to insert an electrode arm for conventional spot welding.

Aerodynamic considerations require the outer skin to be depression-free; also, because of the heavy gage of the inside details, it is desirable to use a ¼ in. radius tip on the inside electrodes and use flat or skin-contoured tips on the outer surface. Under these conditions the weld penetration in the mating parts is optimum.

FIG. 8—Shown here is an index spot welder for landing flap deflectors. The parts numbered are: 1—Sciaky spot welder and control panel; 2—index machine frame; 3—operational control panel; 4—locating fixtures; 5—deflector in place for welding.



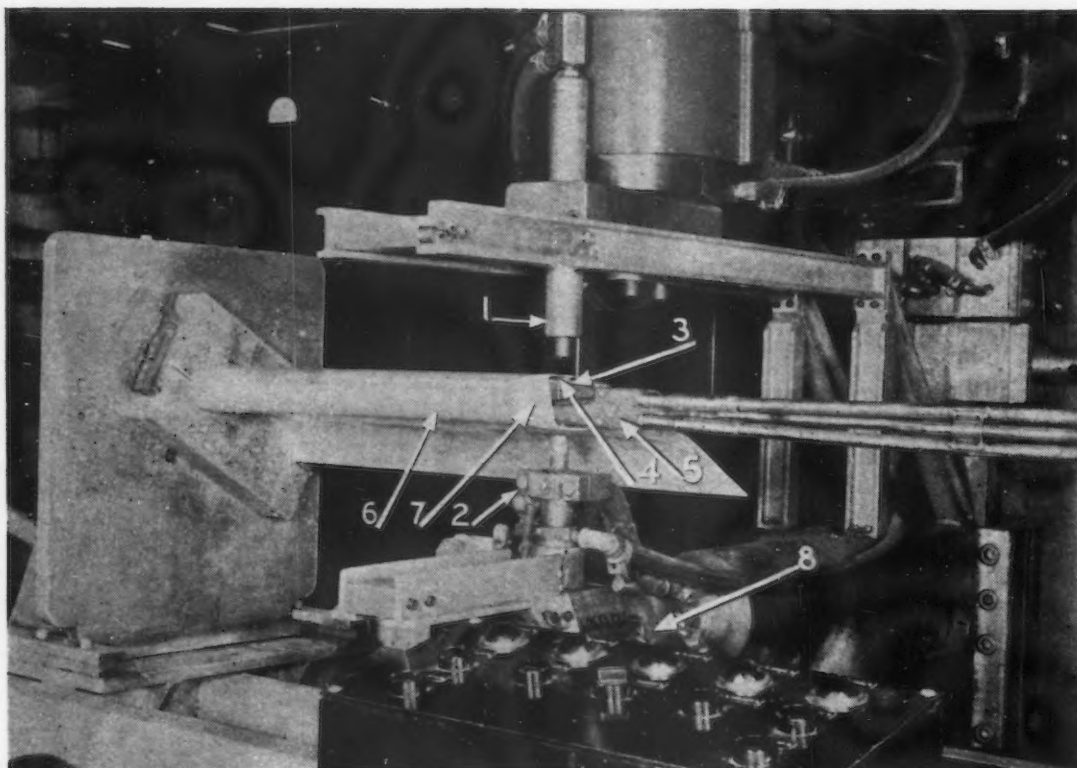


FIG. 9—The landing flap deflector was cut away to show: 1 and 2—Upper and lower retracting electrodes; 3—internal wedge, expanding electrode assembly; 4—replaceable inner electrode tip; 5—Micarta insulation pad; 6—deflector skin; 7—channel stiffener; 8—lower electrode retracting cylinder.

The indexing machine which accomplishes this difficult job, Fig. 8, is built around a Sciaky 50 kw. PMCO-2S16 spotwelder which has been equipped with a 150 amp. breaker and a 650 amp. maximum current relay to increase the output sufficiently to offset shunting losses.

The lower arm of the spotweld machine was modified by boring and inserting an air cylinder, Fig. 9, for operation of a wedge mechanism to raise and retract the lower electrode in step with the lowering and retraction

of the upper electrode. Another cylinder, Fig. 10, mounted on the end of the indexing work table, also operates a wedge mechanism in step with the movement of the spotweld machine electrodes to expand and contract the internal electrode blocks to meet and support the pressure of the outer electrodes, and to furnish a series path between the two opposite weld joints. Water coolant is circulated through the internal expanding electrode assembly.

Cleco assembled deflectors are

placed in the index table jig, the controls properly set, and spotwelds are made automatically at 6 in. intervals. At the limit of travel, the indexing mechanism is reversed and spotwelds are placed at 6 in. intervals on the return movement, halving the previous 6 in. spacing. The next reverse indexing movement, offset to divide the previous spacing, closes the spot spacing to 1½ in. on centers, and the final run places them ¾ in. centers. Between the three in. on center and the 1½ in. on center runs,

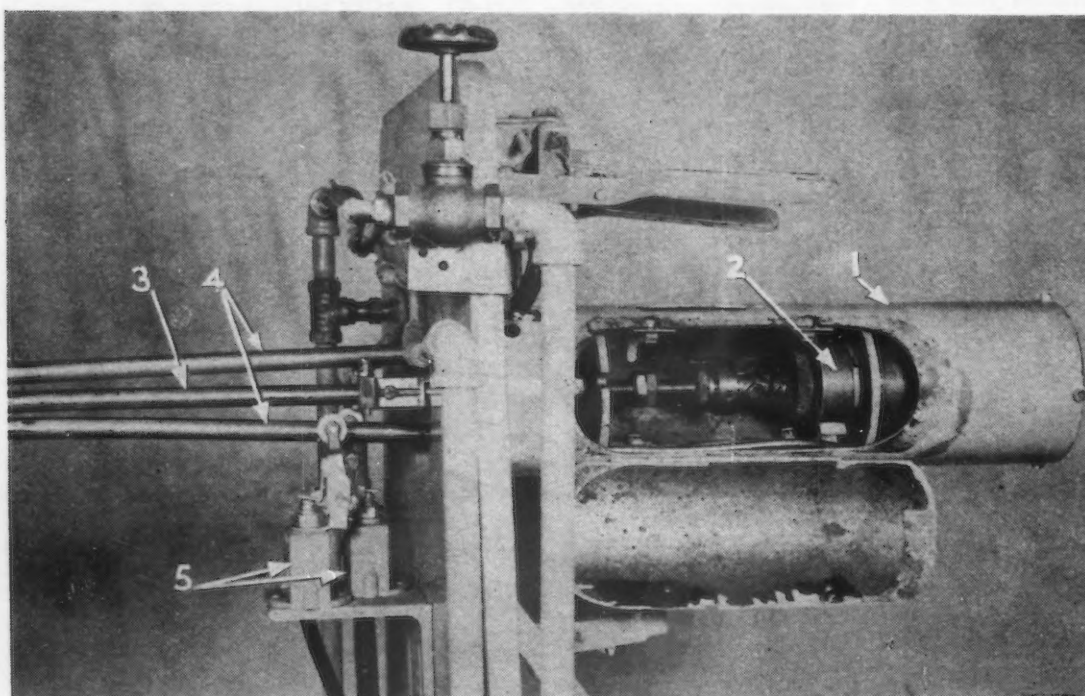


FIG. 10—Internal electrode wedge operating cylinder, showing: 1—Cylinder case; 2—double acting air cylinder; 3—wedge actuating rod; 4—inner electrode support and coolant tubes; 5—sequence micro-switches.



the current limit relay is boosted about 5 amp.; also the current is boosted another 5 amp. for the final run to compensate for the increased shunting as the spot spacing closes down.

Time study shows that spotwelding of this assembly takes only about one-fifth the time required to flush rivet. Also, the outer surface of the spotweld assembly is aerodynamically superior to that of the riveted assembly.

### Collet Dies Aline Flashwelds

A new development in flashweld tooling which has not yet been tried

This small contact area would not support the upset pressure, and the walls on this side would push by without forging. Such a weld may pass a proof load test, but fail in service because of shock loading.

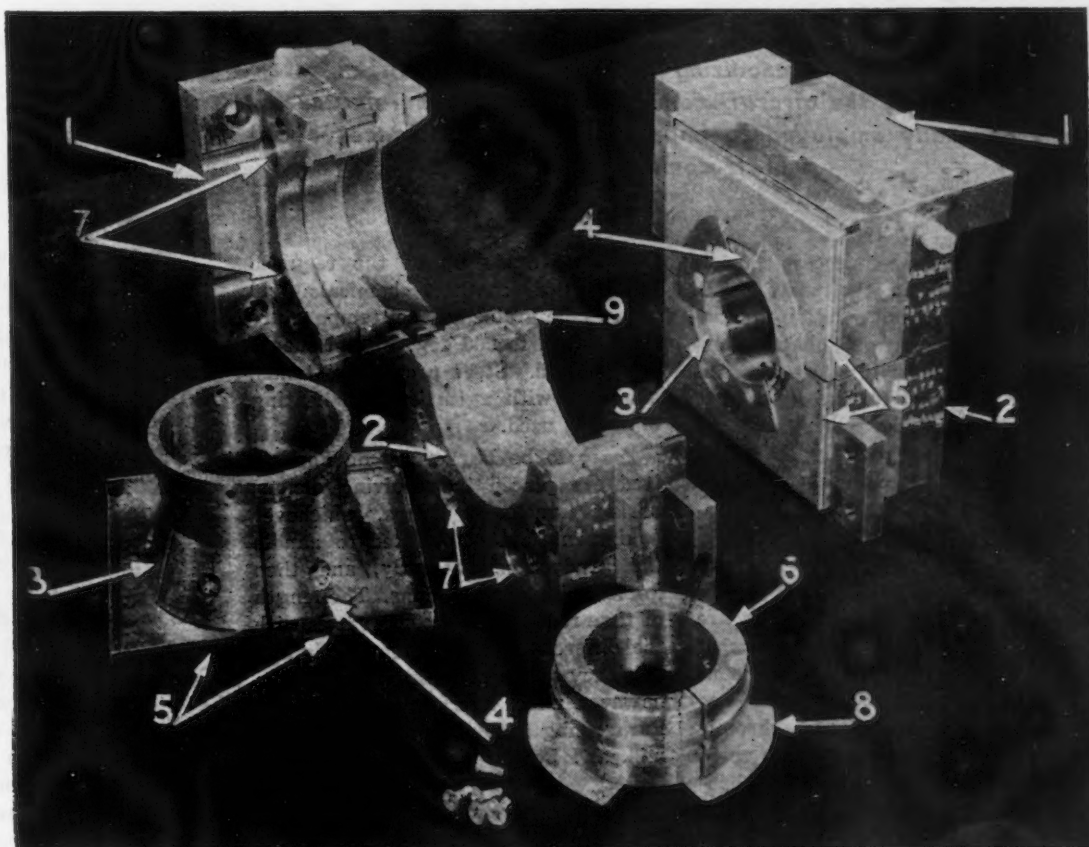
The collet type dies, Fig. 11, aligning the parts concentrically instead of on the bottom side and give uniform contact on the annular mating surfaces; thus the width of material not in contact is only half the total diametric difference. Since the mating is uniform, the upset will be uniform throughout the entire annular contact area and the resulting joint will be as strong as either of the mating

material sizes below bore size by means of key and screw retained segment block sets bored to standard tubing and bar sizes.

All current conducting parts are made of Mallory No. 3 alloy. Flexible conductors connect directly to the moving collet tightening member to insure good current distribution around the collet segment. Flash shields of thin stainless steel are mounted at both ends of each collet assembly to prevent flash from entering between moving parts and thus causing trouble.

The use of concentrically aligning flashweld dies would make the quality

**FIG. 11—A pair of collet type flash weld dies are partially disassembled to show details. The numbered parts are:**  
 1—Master collet holder, upper half;  
 2—master collet holder, stationary lower half;  
 3—master collet, lower half;  
 4—master collet, upper half;  
 5—flash shields;  
 6—collet inserts;  
 7—hydraulic cylinders;  
 8—segment flash shields;  
 9—movable portion of master collet holders which are actuated by hydraulic cylinders acting upon taper of upper master collet, causing segments to clamp part concentrically.



in production, but which shows considerable promise, is a collet type flashweld die set. Flashwelds made on conventional dies are only aligned perfectly if the mating parts are identical in diameter, a condition which never exists. Any difference in diameter is taken up on the top side of the die, so that with a  $\pm 0.010$  in. tolerance the top side of the weld joint may misalign by 0.020 in. While this misalignment would not be of great concern in the case of solid or heavy walled stock, it is serious on thin walled assemblies. On 0.035 in. wall thickness tubing the total diametric, wall thickness and eccentricity tolerances may reduce contact on the top side to as little as 0.010 in. under the most adverse conditions.

Tests on experimental collet dies showed that as much as 0.030 in. differential tolerance could be absorbed with only a 0.004 in. full indicator reading eccentricity of the weld joint. The collet dies for production use are designed so that the lower half of the collet master is rigidly attached to the platens in place of the standard die masters and the upper half is air applied after parts are inserted. The collet segments are tightened by means of four small hydraulic cylinders mounted in the master blocks. No axial movement of the collets takes place; instead the collets are fixed while the block moves.

The collet segment assembly is bored to a large inside diameter and acts as an insert master to take all

of all of any production run more certain as the variation of detail part diameters throughout an acceptable tolerance range would not produce poor welding conditions. On this greater certainty of consistent quality, the present requirement for 100 per cent parts proof testing may be safely modified to accept a destruction test of coupons welded concurrently with production.

To summarize briefly, the relatively small unit production of aircraft in normal times will greatly limit heavy expenditures for mass production spotwelding tooling. This condition may be alleviated somewhat by development of greater standardization of certain aircraft parts and accessories.

# Protective Coatings For Aircraft Parts

**... Parkerizing and Bonderizing to protect iron and steel parts and anodizing and chromodizing for aluminum have been extensively utilized by the aircraft companies. Outlined herein are the steps generally employed to impart corrosion resistance to aircraft components.**

**T**HE Parkerizing process consists of immersing the parts to be treated in a hot solution of manganese dihydrogen phosphate. Bonderizing is primarily the same as Parkerizing except for the addition of reagents to the bath which speed up the reaction. The addition of copper salt is used to accelerate the action of phosphoric acid and later modifications include Bonderite B and Bonderite X.

The complete operations required for Parkerizing and Bonderizing are precleaning of the parts by means of sand blast, degreasing, alkaline cleaning or pickling, Parkerizing or Bonderizing, hot water rinse, chromic acid rinse and a final finish of a resin coating for Parkerized parts or chromate primer for Bonderized parts.

The type of precleaning operation prior to the actual process depends on the type and condition of the parts to be processed.

In common with all other metal finishes, before iron or steel can be successfully Parkerized or Bonderized, it must be free from all grease, scale or other foreign matter. Scaled or rusted parts can be cleaned free of grease and oil by means of vapor degreasing or hot alkaline cleaning, and the scale or rust removed by sand blasting or pickling. Parts free of rust or scale may be precleaned by vapor degreasing or hot alkaline cleaner. For this type of cleaning, the vapor degreasing method is considered, by commercial processing companies, as being the better of the two.

Parkerizing and Bonderizing solu-

tions are made up of the required amount of coating chemicals and water, maintained at a temperature of 180 deg. to 200 deg. F. and should be agitated. Steel processing tanks, equipped with agitation and heating units are used.

Parts to be Parkerized or Bonderized are placed in revolving drums, baskets, racks or trays, whichever equipment is best adapted to handle the production efficiently, and then immersed in the solutions. The length of time required to process varies with the different classes of materials and efficiency of the preparatory cleaning; however, under average conditions the Parkerizing item is approximately 30 min. and Bonderizing 5 min.

## Typical Solution Formula

Parkerizing	
Parco make-up chemical.....	70 lb.
Water .....	100 gal.
Temperature .....	190 deg. F.
Immersion time .....	30 min.

Bonderizing	
Bonderite "D" make-up chemical.	50 lb.
Water .....	100 gal.
Temperature .....	190 deg. F.
Immersion time .....	5 min.

After preparation, the phosphate solutions are adjusted by titration as follows before being placed in operation:

	Concentration
Bonderizing .....	20 $\pm$ 1 points
Parkerizing .....	30 $\pm$ 1 points

The term point shall be considered as the number of c.c. of 0.1N NaOH required to neutralize 10 c.c. of the processing solution using phenolphthalein as an indicator.

For loss of strength through operation, the following additions are made daily or as otherwise required, in or-

der to maintain the solutions within the above concentrations:

	Quantity in lb. per 100 gal. of solution per point loss in strength
Bonderite "D" .....	1.5
Parco make-up .....	1.5

The Bonderizing treatment is intended for application to parts requiring subsequent painting while the Parkerizing treatment is applied as a protective treatment for parts which are partially or completely unpainted.

After removal of the parts from the Parkerizing or Bonderizing solutions they must be thoroughly rinsed in clean hot water at 150 deg. to 185 deg. F. for at least 1 min. This rinse may also contain sufficient chromic acid to maintain a pH value less than 6.8.

As a second and final rinse the parts are immersed for a period of not less than  $\frac{1}{2}$  or more than 1 min. in a 0.05 to 0.1 per cent chromic acid solution maintained at a temperature of from 180 deg. to 200 deg. F. The parts are then immediately dried by compressed air, by heating in an oven, or by tumbling in sawdust. In most cases the parts will dry almost instantly, after removal from the final rinse, due to the heat retained from the processing and rinsing bath.

The final operation is determined by the finish desired on the articles processed. In the aircraft industry, Parkerized parts are treated with an approved resin coating, immediately after drying. The material which has been approved for the purpose and is in general use throughout the industry is Sherwin-Williams "Bond Kote." This is applied by dipping the part in the coating solution and drying at room temperature.

Other types of finishes are obtained on Parkerized parts by the application of any one of several materials sold under the trade name of "Parcolac," by the application of mineral



oil to the surface of the part, by staining, followed by an oil treatment and by the application of special oils and a buffing operation.

Bonderized parts should be given a coat of protective paint or primer as soon as possible after the processing.

### Process Layout

The Parkerizing and Bonderizing unit should be installed in the processing department and/or adjacent to the fabricating departments as well as assembly or other using department. This will assist in maintaining a straight line flow of parts and minimize transportation between departments.

If precleaning facilities, such as degreaser, alkaline cleaning tanks and pickling tanks, are already available, the Parkerizing and Bonderizing unit should be installed in the vicinity of this equipment. The available precleaning equipment can then be used in conjunction with the process, eliminating the expenditure for additional equipment.

All units of installation should be placed in a line so that one track and hoisting apparatus will serve all tanks. Sufficient space should be allowed between the cleaning unit and the processing tank for the convenient handling of articles after they are cleaned, and for loading them in baskets, revolving drums, trays or racks.

Between the processing tank and the finishing unit, space should be provided for unloading production after it is Parkerized.

In some instances and where specifications will permit a modified Parkerizing treatment wherein the time of immersion is reduced to 10 min. may be used in lieu of Bonderizing. Where this is possible installation costs may be reduced by the elimination of the Bonderizing tank.

Where the type of parts permit and it is necessary to meet mass production requirements in the Bonderizing process, a Spra-Bonderizing unit should be installed. This unit consists of a continuous tunnel, completely enclosed, made of sheet steel housing and divided into chambers, where the various steps of cleaning, rinsing and Bonderizing take place automatically.

As the work progresses on a conveyor line through the various steps of the process, it passes a series of stand pipes equipped with spray

nozzles through which the solutions are forced against the material from all angles, flooding all areas to be treated.

### Anodizing

The process which is referred to as anodizing is used exclusively for coating aluminum and aluminum alloy surfaces. By this method a very hard and transparent coating is electro-chemically formed over the surface of the metal which protects the base metal by insulating it from

• • • This article is the fourth and last of a series derived from the survey on "Process and Paint" conducted by the Lockheed Aircraft Corp. under the auspices of the Methods Improvement Panel of the Aircraft War Production Council, Inc. The previous articles were: "Cleaning Aircraft Parts," "Plating Practices of the Aircraft Industry," and "Stainless Steel and Magnesium Pickling."

corroding mediums. This treatment is not a plating process and is used for the processing of aluminum alloys containing not over 5 per cent copper.

Parts to be anodized are subjected to alkaline cleaning followed by a clear water rinse, anodized, rinsed and thoroughly dried.

Alkaline cleaners for aluminum are formulated specifically for a purpose. Those intended for other purposes should definitely not be used. Aluminum will be badly discolored or even completely dissolved by the stronger detergents designed for steel cleaning. The aircraft companies use these specific cleaners formulated for aluminum and maintain the solutions as specified. These alkaline cleaners are maintained at a temperature of 160 deg. to 180 deg. F. which is the maximum for processing aluminum alloys. The parts are immersed in the cleaning solution for a period of time as specified for the particular cleaner being used.

After removal from the alkaline cleaning, the parts should be immersed in a clear hot water rinse. This rinse may be maintained at a pH of 6.8 or below by the addition of chromic acid for the purpose of neutralizing any alkaline carry-over.

After thoroughly washing and rinsing the material to be anodized, it is then placed in a solution containing 2 to 10 per cent chromic acid, maintained at a temperature of 95 deg. F. plus or minus 4 deg. F. The parts are made the anode or plus side, and the negative or cathode is generally the steel tank containing the electrolyte. The treatment is commenced by raising the voltage across the bath (from the anode to the cathode) gradually from 0 to 40 volts at a rate not

exceeding 8 volts per min. The 40 volts should be held for 30 min. to complete the treatment. The required current density of 1 to 2 amp. per sq. ft. is based on the average current density obtained after reaching 40 volts. In no case should the current density at 40 volts be below 0.9 amp. per sq. ft. Standard treatment of specimens of duralumin proceeds in the same way as with aluminum, but in general the current density required, in order to follow the standard voltage curves, is higher. Parts to be treated are submerged in the electrolyte by means of wires, clamps and perforated containers, made of aluminum and aluminum alloy.

After the parts are removed from the anodic treatment they must be given a clear hot water rinse. This rinse is maintained at a pH of 6.8 or below by the addition of chromic acid as required.

Parts must be thoroughly dried after removal from the final rinse. For this purpose hot air drying ovens, held at a temperature of 160 deg. to 180 deg. F. are most suited. This oven should be so constructed that a complete rack load of anodized parts may be placed completely in the oven without removing the parts from the rack. The oven may be gas, electric or steam heated and should have complete air circulation.

The anodizing unit should be installed in the processing department and/or adjacent to the aluminum fabricating departments as well as prior to the painting department. This will assist in maintaining a straight line flow of parts and minimize transportation between departments.

All units of installation should be placed in a line so that one crane way will serve all tanks. Sufficient space should be allowed prior to the cleaning unit and after the drying unit for the convenient loading and unloading of parts from the anodizing racks.

In most plants the anodizing unit is incorporated and installed in the same line as the chromodizing process. This type of installation makes possible the utilization of one set of cleaning and rinse tanks for two processes.

### Chromodizing

Chromodizing applies a protective, corrosion resistant surface to aluminum and aluminum alloys and especially to fabricated parts to which paint coatings are subsequently applied.

[CONCLUDED ON PAGE 184]



# Non-Ferrous Alloy Blanking Dies

FIG. 11—Reaming  
location pin holes.

**... In this the last of a three-part article, the discussion of British practice in the use of inexpensive die material is concluded with a detailed account of the procedure followed in the manufacture of zinc alloy dies. Their general applications in the press shop are also considered. Trial runs on blanking steel up to 18 SWG indicate a die life of about 500.**

FOR clarity, the following description of the method of blanking die manufacture has been divided into a series of sections, all dealing with successive operations. The tool room, on receipt of the tool drawing, obtains the appropriate development from the template stores before proceeding with the manufacture of the die.

**Operation No. 1:** The top and bottom plates, or punch plate and bolster, are made from  $\frac{3}{8}$ -in. mild steel, being flame cut to the required size and surface ground on both faces. In the meantime the  $\frac{3}{8}$ -in. rolled plate is being cut to the required size on the bandsaw.

**Operation No. 2:** The K.M. alloy plate is then attached to the bolster by means of screws and dowels and the punch plate clamped in position so that the holes for receiving the pillars can be drilled and reamed and the pillars fitted. (See Fig. 11.)

**Operation No. 3:** A suitable piece of 3 per cent nickel steel plate is then

surface ground and the template of the developed blank is positioned on the plate and the shape transferred on to it by scribing (Fig. 12). The punch is then band sawed and filed to size, afterwards being drilled and tapped for the screw holes and dowels (Fig. 13). When filing the punch to size it is important to ensure that the sides are at 90 deg. to the face. After these operations have been completed, the punch is sent to the inspection department to be checked against an approved template. As a general rule this department allows a tolerance of  $-0.000 + 0.010$  but in special cases where a high degree of accuracy is required the punch is held to within a tolerance of  $\pm 0.003$  in.

**Operation No. 4:** The punch is now ready for hardening. This treatment consists of soaking for three-quarters of an hour in a sodium cyanide rapid deep bath (containing approximately 20 per cent sodium cyanide) at 1580 deg. F. and then quenching in Texaco 503 oil. This hardening treatment

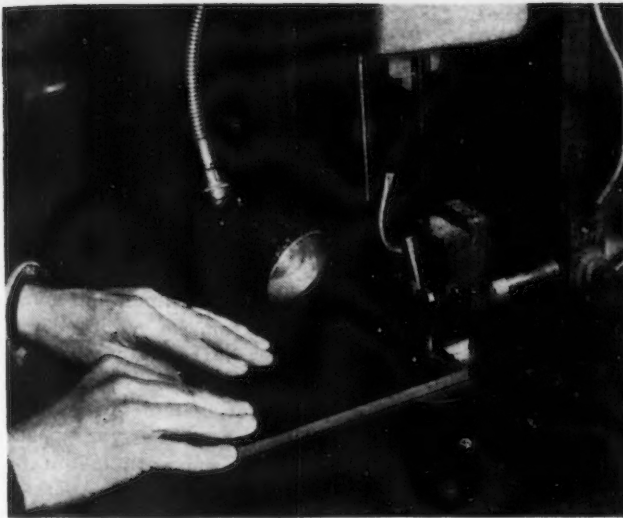
gives a Vickers hardness numeral reading of between 752 and 822 with a penetration of about 0.010 in.

**Operation No. 5:** The punch is then placed on the punch plate in its correct position and the screw holes spotted through from the existing holes in the punch (Fig. 14). The punch is now attached to the punch plate by fitting the screws. The two dowel holes in the punch are subsequently transferred into the punch plate by drilling and reaming, although the dowels are not fitted at this operation.

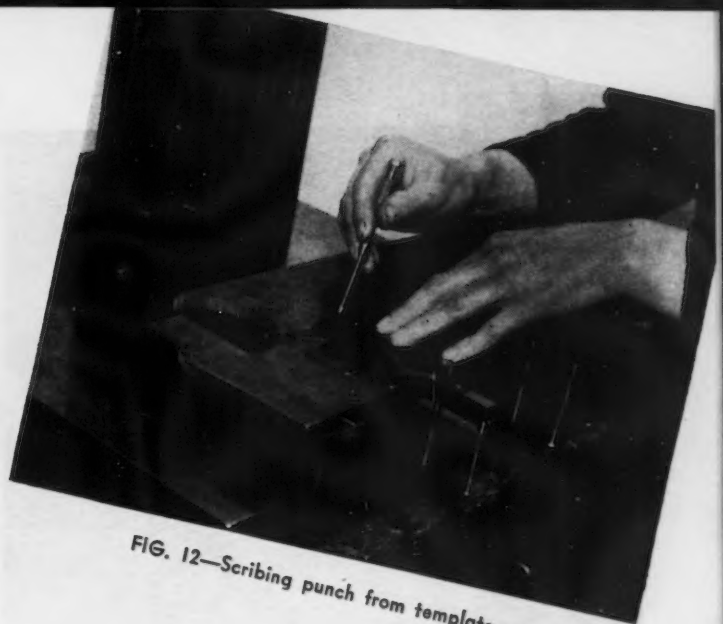
**Operation No. 6:** At this stage the punch plate with the punch attached is assembled to the K.M. alloy die and bolster, the whole being securely clamped together, the dimension between the punch plate and bolster being secured by the locating pillars. The two dowel holes in the punch, drilled and reamed in the previous operation, are now transferred by drilling and reaming into the K.M. alloy die (Fig. 15). The punch and K.M. alloy die are next dismantled and the punch repositioned on the die by means of the two reamed dowel holes. By scribing from the punch, the shape of the die is transferred to the K.M. alloy plate (Fig. 16).

**Operation No. 7:** The punch plate and punch are now removed and the K.M. alloy plate dismantled from the bolster. The die is cut to shape on the band sawing machine, taking great care to cut within 0.010 to 0.015 in. of the scribed line so that the die will be smaller than the punch (Fig. 17). The importance of obtaining the correct shearing allowance in the die must be emphasized. This is required so that the punch can be sheared cleanly into the die. The actual shearing is performed in a later operation. Any excess left over after the shearing operation is removed by filing (Fig. 17).





**FIG. 13**—After the shape of the punch is transferred to the nickel steel plate, the punch is then band sawed and filed to size and screw holes and dowels are drilled and tapped.



**FIG. 12**—Scribing punch from template.

*Operation No. 8:* This stage consists of removing the punch from the punch plate and fitting the spigot into the latter. This spigot is used for attaching the top half of the tool to the press when in operation. The larger tools are not provided with a spigot, but are secured to the press ram with standard clamps. The die is also reassembled with the bolster at this point and the tool is made

ready for shearing the punch and die.

*Operation No. 9:* The completed blanking die is then mounted in a press and the punch sheared into the die for approximately  $\frac{3}{16}$  in. (Fig. 18). The pressure required to perform this operation is considerable and a power press, either of the mechanical or hydraulic type, should be used. Small dies, however, can be satisfactorily sheared on a heavy hand press.

The tool is then removed from the press and the sheared metal removed (Fig. 19). Generally this can be cleared away with a scraper or chisel without dismantling the die from the bolster, although dismantling may be necessary with very intricate shapes.

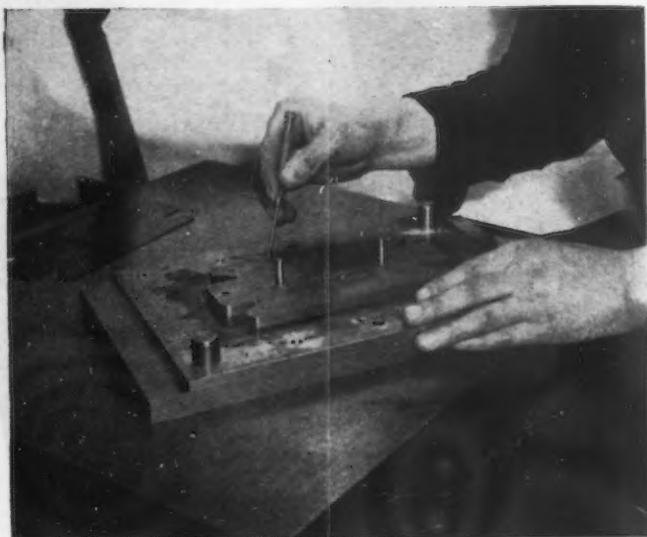
*Operation No. 10:* The location pins for positioning and feeding the stock to be blanked are next fitted. The rubber ejectors (which project  $\frac{1}{16}$  in.



**LEFT**  
**FIG. 14**—Drilling punch attachment holes.

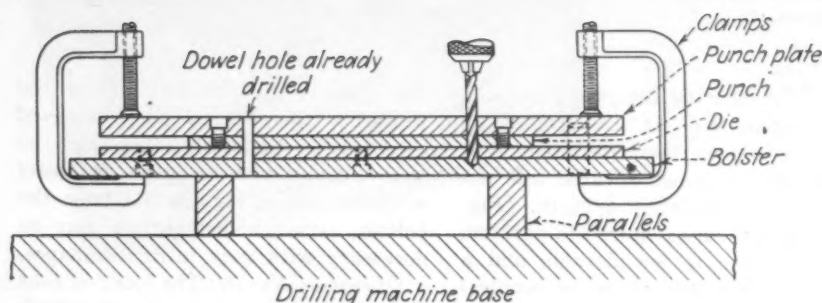
**RIGHT**  
**FIG. 15**—Transferring dowel holes onto the K.M. alloy die.





LEFT  
FIG. 16—The shape of the die is transferred to the K.M. alloy plate from the punch.

BELOW  
IN Fig 16a is shown a cross-section of the die.



above the die and a similar amount below the punch) are attached around the punch and die by cementing them to the punch plate and bolster with Bistick B (Fig. 20). A specimen blank is now produced for proving the die acceptable for quantity production.

This method of manufacture has proven most satisfactory and is now generally adopted in these works. The sequence of operation enumerated can obviously be changed to meet the specific requirements prevailing in various tool rooms. In the early days, when making these blanking dies in K.M. alloy, the company adopted the following slightly different method for locating the punch. The die was marked out from the template and sawed to size, leaving the usual shearing allowance, before the punch was attached to the punch plate.

The punch was then accurately positioned on the die and clamped into position, making sure that sufficient metal was available to produce a complete shear. The dowel holes in the punch were then transferred into the bolster and loose dowels fitted. The clamps were then removed and the punch plate assembled. Following this the complete assembly was clamped together and, by removing the loose dowels, the punch was positioned on the punch plate by transferring the dowel holes into it. Although this

procedure was reasonably successful, this operation depends, as will be noticed, upon the accurate location of the punch over the die. As this is not always easily maintained with so little latitude, the method was discarded in favor of the more straightforward sequence which has been given in detail.

As previously mentioned, the enormous number of tools required for a new type aircraft makes possible a considerable degree of standardization

in the size of the tools that will be used. The various detail parts of the blanking dies, such as bolsters, punch plate, location pillars and press spigots are, therefore, manufactured in quantities of the sizes most used and placed in store to meet future requirements. The manufacturing time is, therefore, reduced by reason of the bulk production of detail parts.

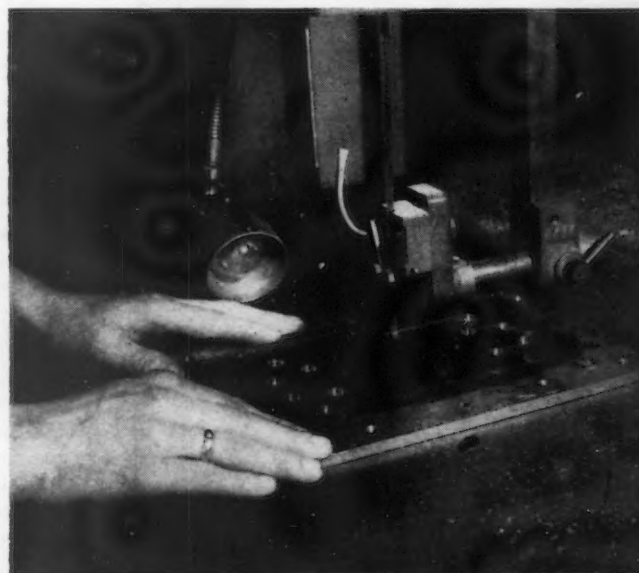
The saving in toolmaking man-hours required for the manufacture of blanking dies in this alloy will now have become apparent to the reader. The time used, for example, in making the die shown in Fig. 21 is very small indeed in comparison with manufacturing by older methods. Another point in favor of the alloy and the manufacturing process is the fact that semi-skilled labor can be used in their manufacture. A die is shown in Fig. 10d which was produced in 38 hr. by a youth of 19 years, whose previous toolmaking experience consisted of a period of 18 months on a lathe.

#### Important Features

During the research by the company on the manufacture and operation of these tools certain data have been collected which will be of interest to record in this section.

The method of ejecting the blanks by means of rubber has already been described and has proved quite satisfactory with the following proviso: It is essential to provide a minimum gap of approximately  $\frac{1}{2}$  in. between the blocks of rubber, otherwise distortion of the blank will result. When the blank is of 20 SWG or under and its shape is of an intricate nature, having long narrow extensions, difficulties may be experienced in ejecting. When a case such as this occurs, the cementing of a steel plate of ap-

FIG. 17—Correct shearing allowance is required so that the punch can be sheared cleanly into the die. Any excess left after the shearing operation is removed by filing. Here the die is being cut to shape on the band sawing machine.





proximately 16 SWG on top of the rubbers has been found to answer admirably. The rubber is reduced in depth accordingly. Extremely difficult shapes can be assisted locally by a spring loaded plunger in addition to the rubber segments.

When designing very small blanking dies it is advantageous to discard the use of rubber ejectors in the die and make it so that the blank will drop through the bolster in the normal manner, as very little extra time is involved in cutting the clearance through the bolster. This will, of course, necessitate backing off the die within about  $\frac{1}{8}$  in. of the cutting edge.

Consideration must be given to the power required for compressing the rubber strippers. This can reach a high percentage of the blanking pressure and care must be taken to see that the press, for which the dies are intended, has ample power.

The location and feeding of the stock by means of simple locating pins was decided upon for the following reasons: (1) Because of the inconsiderable time taken in their manufacture and fitting, and (2) it may be necessary for various sizes of blanks to be cut from individual sheets. This type of location is quite efficient in this case.

It was realized, however, that when using strip stock this method would not be ideal, but as the majority of strips used in the aircraft industry are cut from sheet, these strips would be short enough to prevent their becoming unwieldy. This was confirmed in practice.

The first blanking die manufactured from K.M. alloy by the com-

*"Mass Production of Kirksite Blanking Dies" by W. W. Broughton, THE IRON AGE, Jan. 20, 1944.*

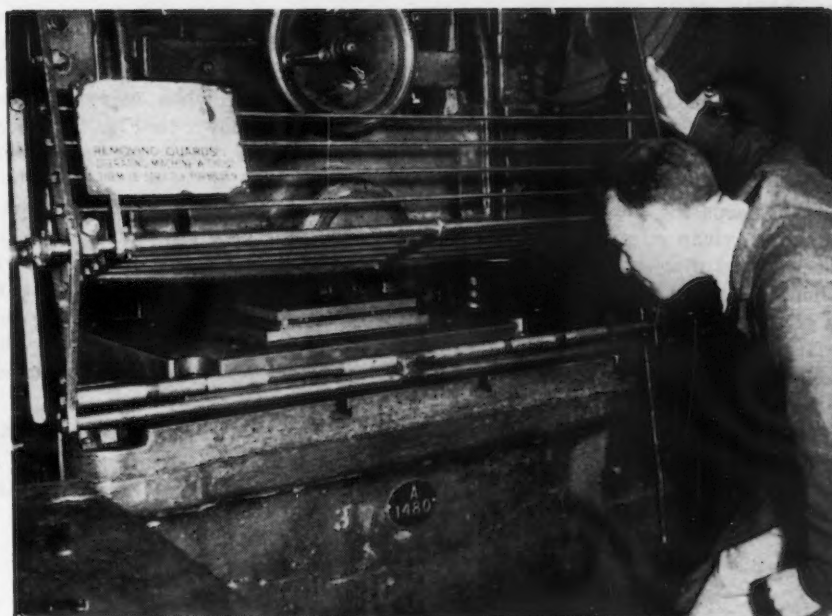


FIG. 18—The completed blanking die is mounted in a press and the punch sheared into the die for approximately  $\frac{3}{16}$  in.

pany had the dies undercut in a similar manner to the method adopted in America for Kirksite dies and recently described by Broughton\*. The reason for this undercutting of the die was to enable the sheared metal to be cut cleanly away during the operation of shearing the punch and die together. With the use of rubber for the ejection of the material it was obvious that in the actual operation of blanking the stock would only enter the die by an amount slightly in excess of its gage thickness. It was found by tests that the punches could be sheared into the die and the sheared metal satisfactorily removed without the use of this undercut. It was decided, therefore, to discontinue undercutting the dies except in the case of small tools where the blank was ejected through the bolster.

The depth of shearing in the die was standardized at approximately  $\frac{3}{16}$  in. This was found to meet the requirements of the majority of gage thicknesses used. Another point in favor of leaving the dies square rather than undercutting was the extra support and strength imparted to the cutting edge. The value of giving extra support and strength to the cutting edge of the die was revealed by the appreciable reduction of compression in the vicinity of the cutting edge after long runs.

Should the die for any reason be spoiled during the shearing operation, it can be saved without having to remake it by turning it over and reversing the punch. Shearing is then repeated. This operation can be resorted to should the die wear to such an extent that the blanks produced are not suitable for production and virtually a new die is made available with the minimum of delay and without having to use extra material.

The K.M. alloy plate, on which the research work was performed, was  $\frac{1}{8}$  in. thick and a further consignment was received and made up into blanking dies which are now in full production with excellent results.

The question of whether it would be advantageous for thicker metal to be made available was given consideration and, after careful study of the action of these dies after various quantities of blanks had been produced, it was decided that no advantage would be obtained. On the contrary, it was the opinion that thicker plates would have a greater tendency to compress around the cut-

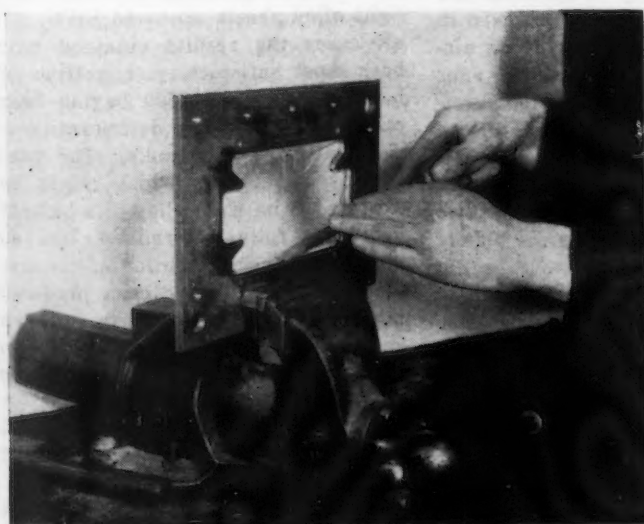


FIG. 19—Removing sheared metal. Generally this can be cleared away with a scraper or chisel.

ting edges of the die. It should be explained here that there is no clearance between the punch and die as is usual in normal practice. In operation the die face is compressed at its cutting edge causing the metal to flow slightly towards the punch. This action keeps the die sharp, giving as a result, clean edged blanks. It has been found that, with a new die, although the first few blanks may have a slight burr, this quickly disappears after a few more have been produced.

Should it be desired to increase the dimension between the top of the die and the face of the bolster for the

used with these dies make it important that they are well supported to prevent distortion. This support is easily provided when using a press of the type shown in Fig. 18 where the ram area is the same as the bolster.

On some types of press the area of the ram is often quite small in comparison with the press bolster. In these cases the area of the ram can be increased by fitting a false end to it. Three of the presses in the company's works have been so fitted, proving most useful.

The fact that most of the fittings

a saving in manhours would be effected. A suitable detail part was therefore, selected and a design of a blank and pierce die produced as shown in Fig. 22. This tool was manufactured in the company's tool room and passed over to the press shop so that its behavior could be observed under production conditions. The result of this test was very encouraging and a considerable number of blanks were produced. As a result further dies of this type are being manufactured. It will be observed that, fundamentally, the die is similar to those already described and illustrated in Fig. 18.

The punch, however, was mounted on the bolster in order that the piercings from the rivet holes could be discharged through the bottom of the bolster instead of having to return them to the face of the die. The punches for piercing the rivet holes were mounted in the punch plate and secured by peening over (the ends having been left soft) and a shoulder was provided to prevent them being pushed up through the punch plate. The same method of ejecting the blank and stripping the stock was retained and the small blocks of rubber for this purpose can be seen quite clearly in the illustration.

The time saved showed a great reduction over what would have been taken in making a steel die of the follow-on type similar to that shown in Fig. 1.

It is anticipated that a considerable decrease in the manufacturing time will be attained after more experience has been gained in making dies of this type.

The piercing punches which are used with these dies are now standardized in their various sizes and the manufacturing time will be reduced still further.

The dies already in production have been used for blanking aluminium and light alloy sheets up to 16 SWG. In all cases the results obtained have been most satisfactory, quantities of between 2000 and 2500 having been produced without any deterioration in the quality of the blanks. The total quantity of blanks which might be expected from K.M. alloy dies has not yet been fully determined, but an inspection of the condition of the dies after some 2000 have been produced makes it quite reasonable to expect a run of at least 15,000 or more before any attention should be given to the die. Several dies have been made for blanking mild steel of 22 and 20 SWG and quantities of several hundred blanks have been produced.

Tests are now being conducted with

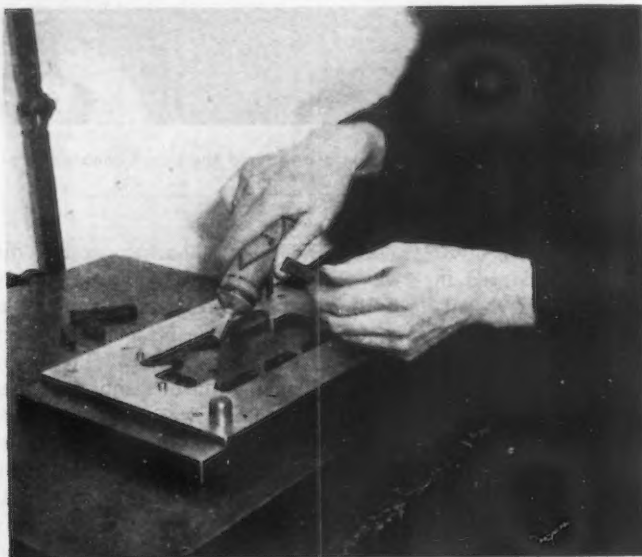


FIG. 20 — Rubber ejectors are attached around the punch and die by cementing them to the punch plate and bolster.

purpose of fitting deeper rubber ejectors, it is considered that better results can be obtained if the bolster is made thicker and the necessary pockets machined, or packing placed under the die to provide the extra depth rather than by making the die thicker.

The lack of clearance between the punch and die makes it imperative that accurate location between the top and bottom portions of the die be maintained. The company has found that the short locating pillars, previously mentioned, have proved satisfactory provided there is no clearance between the ram and the slides of the press.

### General Application

The process of operating the dies in the press shop is fundamentally the same as is used for the more conventional type of tools. The only additional equipment which must be provided are special false bolsters for attaching to some of the presses. These are required for reducing the shut height of the press. The relatively thin punch plates and bolsters

manufactured in the aircraft industry are of thin gage light alloy, requiring comparatively low blanking pressures, makes it desirable to have presses which have large bed areas although of a low power rating. The press shown in Fig. 18 is a good example, the ram and bolster size being  $31\frac{1}{2} \times 19\frac{1}{2}$  in. with a pressure of 40 tons at the bottom of the stroke.

The limited supply of material and the enormous number of dies used in producing the detail parts of an airplane necessitate very short runs with each particular press tool, consequently frequent changing of the tools has to be made. The use of K.M. alloy has shown a saving in setting time over other types due to their lighter construction and as the blanks are returned to the face of the die it is unnecessary to provide parallels on which to clamp the tools.

The types of tools have so far been confined to blanking and simple compound dies. The company was of the opinion that this material could be used for making blanking and piercing dies, provided that these were designed in compound form and also



an improved alloy known as K.M. Plus for blanking steel up to 18 SWG and the results so far obtained show that these dies will be satisfactory for quantities of approximately 500.

Where small quantity production is required these dies show a definite reduction in costs and even if the qualities are such that a new die position of the tool has to be made before an order can be completed, the press would still be an economical proposition. When further experience has been obtained with the use of these dies when blanking steel, it is quite possible that the quantity mentioned above will be greatly increased.

K.M. alloy in ingot form has been used to manufacture tools by casting the die around the punch. This method is used by some of the American firms using Kirksite. The dies produced are quite satisfactory, and although they showed a saving in man-hours over steel, the practice has been discarded in favor of making the die from plate for the following reasons: Special metal molds are required for mounting the comparatively thin punch so that the molten metal can be poured around it to form a homogeneous casting. A quantity of these molds would, therefore, have had to be made before embarking on the quantity production of cast dies. The die, after casting, would require a certain amount of machining on its faces. This is unnecessary with the plate material as it is considered that, as the company's zinc alloy foundry is already overloaded, better results will be forthcoming with the plant available by standardizing the use of plate material.

The use of K.M. alloy for casting drop hammer dies and form blocks for use on the stretching press and special tools used in conjunction with the Guerin process has considerable advantages, particularly for the manipulation of steel and heavy gage light alloys due to the greater strength and hardness of this alloy as compared with secondary zinc. The company is also experimenting with certain types of bending tools (which have hitherto been manufactured in steel) by casting the various parts in this material and subsequently machining them. Several of these tools have already been produced and so far are proving quite satisfactory for production. The advantages gained from manufacturing bending tools from K.M. alloy have been the short time necessary to produce the requisite castings from plaster patterns and the ease with which this material can be machined.

The use of castings in this material

has proved very satisfactory for certain other types of tools, for instance, the very complicated shaped drilling gates used for drilling rivet and bolt holes in such parts as wing fillets, air intake and oil cooler fairings. This method shows a great saving in time

the metal thin and suitable ribbing to provide strength. The patterns and castings of these drill gates are made up by the company's zinc alloy foundry in a fraction of the time taken by skilled toolmakers with the old method and the added advantage is

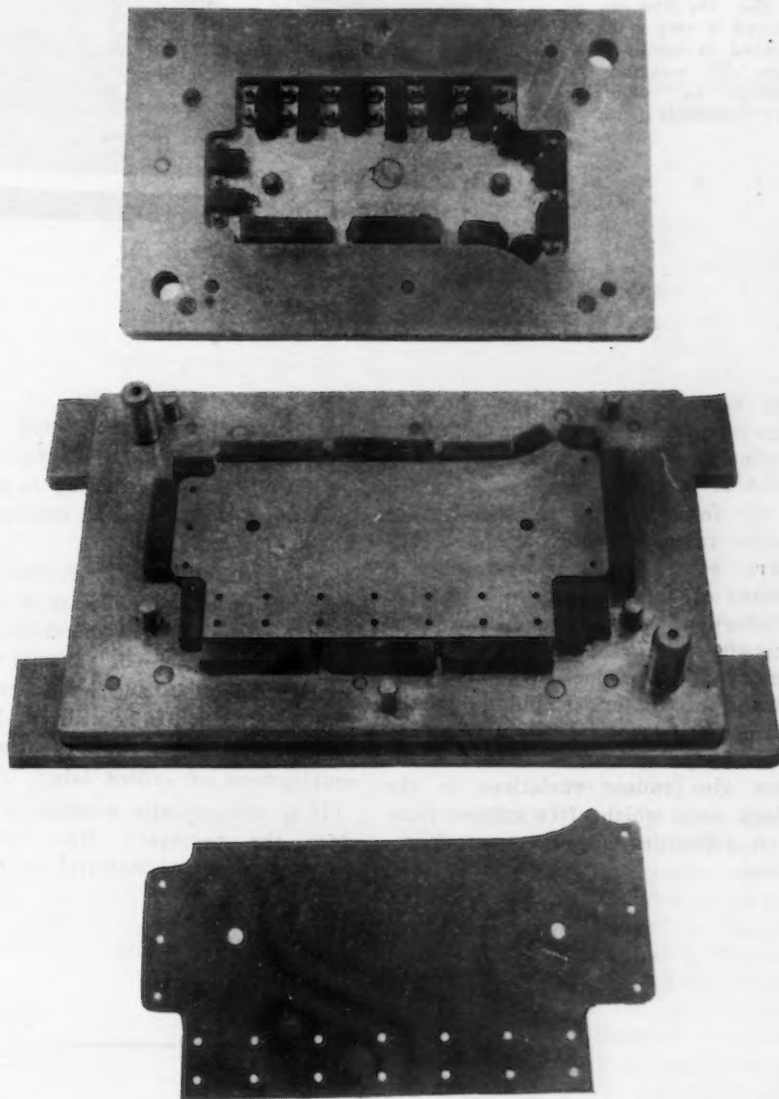


FIG. 22—Blank and pierce die. Tests results with this tool were so satisfactory that other dies of this type are being manufactured.

and, more important, gives greater accuracy than was usually achieved with the old method of fabricating the drill gates from steel or light alloy bar.

The patterns for these castings are produced in plaster direct from the full size models normally used for checking the finished part. It has been found that the patterns so produced are quite satisfactory, provided that the contraction allowance is made on the overall dimensions, the actual difference of contour due to the contraction of the metal being insignificant. The castings are made as light as possible by keeping the section of

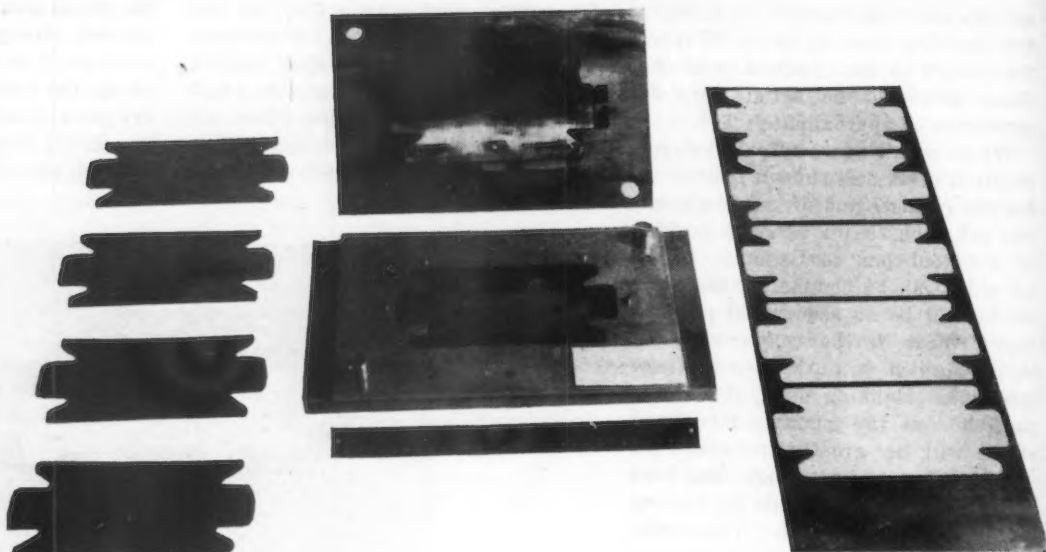
obtained of being able to reproduce castings should it be necessary.

#### Summary

The introduction of K.M. alloy to the aircraft industry has revolutionized the speed with which tools of the types already described can be designed and made. The main advantages can be summarized as follows:

- (1) Blanking dies can be manufactured in a fraction of the time previously taken with steel tools.
- (2) The cheapness with which these tools can be manufactured in the blank and pierce form means a saving in the number of tools required

FIG. 21—Blanking die. The time required is very small indeed in comparison with manufacturing by older methods



per component by making the drill jigs unnecessary. This not only saves toolmaking manhours but production time as well.

(3) In many cases, they can replace router templates which although they have served their purpose as a means of obtaining cheap and rapid production have many drawbacks. For instance, the great majority of parts could not be produced completely by means of router templates as the diameter of the cutters is too large to give sharp corners. Wear on the cutters also causes variations in the blank sizes which often creates location difficulties in subsequent operations.

(4) The construction of these blanking dies is such that their weight is considerably less than those of the older type, resulting in easier handling for storage and setting purposes.

(5) Small quantity production is no longer a practical difficulty to planning and production engineers. In the past such methods as hand work, routing, nibbling, and hand bending, and forming had to be utilized. These were slow and costly and required the employment of skilled labor.

It is economically possible to produce the necessary dies, bending tools, etc., in this material for quan-

ties as small as 200 resulting in a reduction of manufacturing time, and perhaps more important, a higher standard of quality and uniformity of size in the finished product.

(6) The K.M. alloy used in these tools can be recovered by remelting after they are no longer required and the metal used for casting into new tools. The punch and punch plate recovered from redundant blanking dies can be used repeatedly. The fact that the bolsters have no holes for the blanks and also a liberal allowance of metal left between the edges of the blank and the sides of the dies increases their usefulness.

## Boron-Steel Standards for Spectrographic Analysis

SIX new standard samples for spectrographic analysis, representing various compositions of boron steel now widely used for military equipment, will go on sale at the National Bureau of Standards about Aug. 1, according to Dr. Lyman J. Briggs, director.

In this type of steel, the desired physical properties are obtained by substituting a minute amount of the element boron for certain constituents that are difficult or impossible to get

hold of under present conditions. Because of the very low concentration of boron required, the only practicable method for producing this steel is to regulate the amount of boron by rapid and accurate spectrochemical analyses. However, up to the present time this procedure has been impracticable because of the lack of accurately compounded rods of this special steel containing just the right amount of boron, that could be used as standards. The demand for such

controlled standards has been insistent. It was recognized that even if rods having sufficiently accurate composition could be produced, it would still be necessary to improve the conventional method for their use until it showed sufficient sensitivity for the purpose. Such an improved method, sensitive to 0.0007 per cent of boron, has been developed and new standards representative of six steels, suitable for analytical calibrations are now ready for distribution.

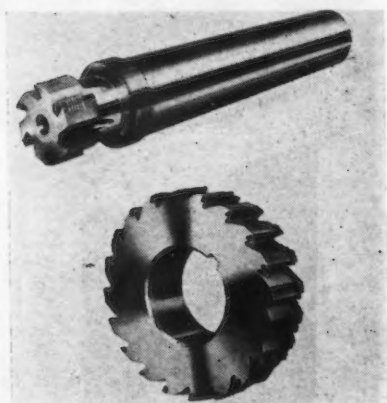


# New Equipment . . .

## Small Tools and Gages

. . . New developments in cutters, fixtures, fastening devices, grinding wheel dressers, gages and other measuring instruments are described in the following pages.

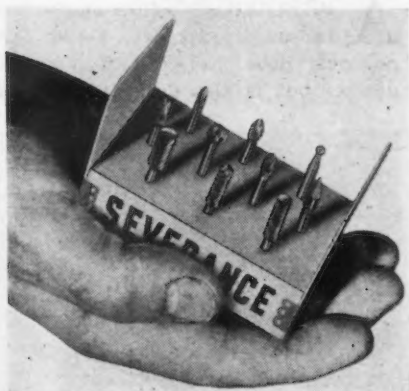
**A** LINE of carbide insert thread milling cutters is announced by the *Plan-O-Mill Corp.*, 1511 E. Eight Mile Road, Hazel Park, Mich. Intro-



duced for the first time to the United States, they are available in National, Whitworth, Acme, V, and special forms, ground or unground, with straight or spiral flutes, with or without provision for the Higbee cut. Both shank and shell type cutters are offered. Among the advantages claimed for the new line of carbide insert cutters are faster cutting, exceptional finish and accuracy and longer tool life.

### Midget Milling Cutters

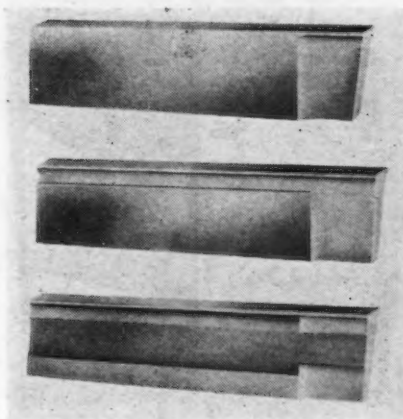
**F**OR plants that require especially fine finishings of castings, patterns and parts, *Severance Tool Industries, Inc.*, Saginaw, Mich., has



announced their midget milling cutters with  $\frac{1}{8}$  in. shanks. They are available in ten shapes. The burring cutters, like their larger  $\frac{1}{4}$  in. shank tools, are said to cut sharp chips from the hardest metal, wood or plastic.

### Grooving and Cutoff Tools

**G**ROOVING and cutoff tools of Haynes Stellite cobalt-base alloy have been announced by *Haynes Stellite Co.*, Kokomo, Ind. The grooving tools are finish ground and lapped to specific tolerances. The cutoff tools are ground to size but not lapped unless specified by the purchaser. Both



types of tools may be obtained in either 98M2 or Star J-Metal alloy, with Haynes Stellite 98M2 especially recommended for steel.

Grooving tools are furnished in three types—plain, channel and I-beam. The cutoff tools are made in Styles 1 and 2 both of the double-bevel type with tapered sides providing side cutting clearances. A 6 deg. angle at the top and bottom edge of Style 2 makes it adaptable for certain cutoff tool holders.

### Round Tool Bits

**R**OUND tool bits, made either from Stellite 98M2 or Stellite Star J-Metal alloy, are furnished by *Haynes Stellite Co.*, a unit of *Union Carbide and Carbon Corp.*, Kokomo, Ind. These round tool bits are furnished centerless ground to tolerances of plus 0.000 and minus 0.002 in. on the diameter, and plus or minus 1/16 in. on the length. Stellite round tool bits are used on turning or boring operations, or can be ground into drills or reamers. Tool bits of 98M2 are made for faster machining of steel; Star J-Metal has long been used for machining cast iron, malleable iron, bronze, brass, aluminum, and some steels.

### Collet Chuck

**A** COLLET chuck in two sizes, one for  $1\frac{1}{2}$  in. 8 thread spindles with  $\frac{3}{8}$  in. collet capacity and one for  $2\frac{1}{2}$  in. spindles and under with  $1\frac{1}{8}$  in. collet capacity has been announced by *Allison Tool & Engineering Co.*, 4031 Whittier Blvd., Los Angeles 23. Design features include a full circular, low pressure cam to activate the collet closing mechanism and an operating handle which travels at right angles to the ways of the lathe bed allowing the operator one free hand to insert, feed the stock or operate the bed turret. It is claimed that because of the large area of the circular cam, pressure at any point is



reduced approximately 90 per cent as compared with collet closing mechanisms using high pressure, pins, wedges or dogs.

### Pneumatic Bench Vise

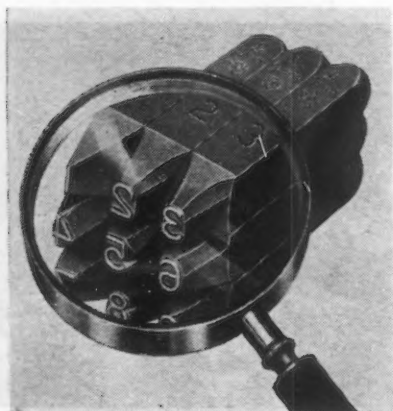
**F**OOT control of the air pressure which actuates the VISpeed unit announced by Van Products Co., Erie Trust Bldg., Erie, Pa., converts any 4 or 4½ in. vise into a work holding device which leaves the hands of the operator free to handle the work or



manipulate the tools. Toe pressure on the pedal causes the vise jaws to close, heel pressure to open them. Pressure at the vise jaw for holding the work is up to 2½ ton. Once the required jaw opening is selected, the piston stroke can be adjusted up to 1 in. to speed up the opening and closing of the vise. The unit is easily attached to the vise body and does not interfere with hand operation of the vise.

### Steel Stamps

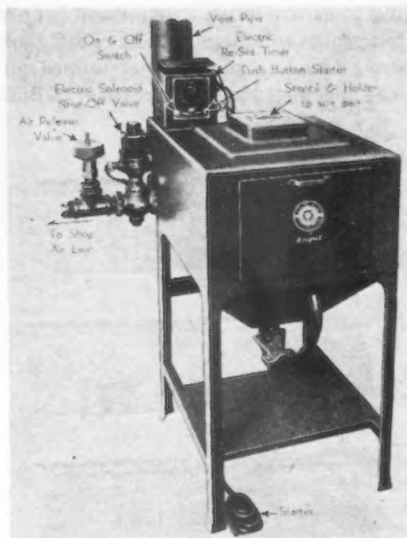
**A**N improved style of rounded face characters of special design, Lo-Stress steel stamps for stamping aircraft and automotive parts and assemblies has been announced by James H. Matthews & Co., 3942 Forbes Street, Pittsburgh 13. Be-



cause the resulting impressions are rounded, the stamps provide a minimum of setup stress and can be supplied in single letter and figure stamps, stamping dies, roller dies and multiple character stamps. The marking tools can be supplied for any desired marking depth to suit the stamping application.

### Marking Unit

**A** UNIT for marking delicate and precision parts having a ground or mirror surface that cannot be marred or distorted has been developed by James H. Matthews & Co., 3942 Forbes Street, Pittsburgh 13. Marking of metal, glass, fiber or plastic parts is accomplished by means of a short blast of fine grit material against rubber or celluloid stencil masks upon which the part to be marked is placed. The desired marking is cut into the stencil and the resulting mark is a light, clear-cut impression, without liquid to cause rust



and without burrs. Suitable fixtures are made to hold parts so that they can be quickly handled by the operator. The unit is operated by air pressure and is similar to sandblasting except that it is constructed for very fine work.

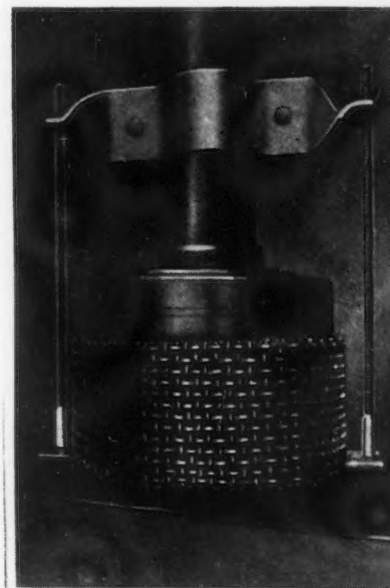
### Pilot Stamp Guide

**A** UNIVERSAL marking device for stamping markings uniformly around the circumference of round holes has been developed by New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7. The device consists of a pilot holder and a removable bushing or marking die. The marking die is retained on the holder by two set screws which fit into a groove machined into the pilot. The set

screws are so arranged that all hammering strains are transmitted to the shoulder of the guide. The guide is manufactured to fit individual requirements, different marking dies being engraved for each different series of numbers.

### Coolant Strainer

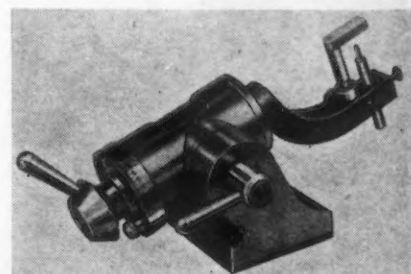
**I**NCORPORATING a straining element of large surface and depth area designed to enclose the base intake of immersed centrifugal pumps



in grinders, automatic screw machines and other machine tools, the Model F Metex knit wire mesh coolant strainer has been announced by Metal Textile Co., Orange, N. J. The fixture bolts to the pump shaft and centers the strainer which is drawn up on threaded bolts and sealed over the pump intake. The feet or lugs of the pump base casting imbed themselves in the mesh. The large openings in the mesh in relation to the diameter of the wire from which it is knitted provide an exceptional capacity to hold chips and dirt without clogging.

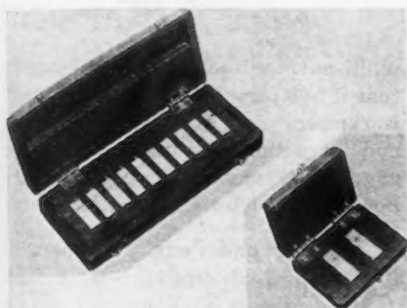
### Angle Correcting Radius Dresser

**A** PRECISION angle correcting radius dresser, No. T-124, that not only does the work of a radius dresser but is also designed to dress





the corrected radius on a wheel for grinding compound and compound-complex forms on flat form tools, etc., has been announced by *U. S. Tool & Mfg. Co.*, 6906 Kingsley, Dearborn, Mich. This dual-purpose tool employs the direct reading principle, eliminating all guess work from this type of wheel dressing. All exposed, unpainted parts are chrome plated to insure against stain and rust.



### Carbide Gage Blocks

**C**ARBIDE gage blocks offered in sets have been announced by the *Jansson Gage Co.*, 19208 Glendale Avenue, Detroit 23. Three all-carbide sets are available, of ten, two sets of two blocks respectively and one set of 81 steel blocks with two 0.050 in. tungsten carbide wear blocks. The Jansson ten-block carbide set ranges in size from 0.050 to 0.509 in. in steps of 0.0001 in. The two smaller sets are intended primarily to be used as wear blocks with steel gage blocks. One contains two 0.050 in. blocks, the other two 0.100 blocks.



### Snap Gage

**E**XTENDED anvil adjustable snap gages which it is claimed speed up inspection have been announced by *Sheffield Corp.*, Dayton, Ohio. The gage can be used as either a hand or stand type. A. G. D. locking devices are used on the adjustable anvils. Square type anvils are furnished as

standard; pin type anvils are supplied on request. Twenty-five standard models cover the range 0.000 to 6.625 in. and also provide the choice of two different height lower anvils.

### Diamond Dresser Tool

**A** DIAMOND dresser tool for both hand and machine dressing has been announced by *Diamond Tool Co.*, 938 East 41st Street, Chicago 15. The tool consists of an ejector type handle and a "Big-Hed" diamond nib which is held firmly in the handle for use on a steady rest of the grinder wheel. To release the nib for use in the adaptor rod of a Norton cylindrical grinder or any other machine taking a 7/16 in. shank rib, the operator holds the handle, presses down on the ejector rod and the nib pops loose from the handle. When further use as a hand tool is required, the nib is pressed by hand back into the handle socket. The tool is available with resettable nibs containing diamonds in sizes of 2 carats and larger.

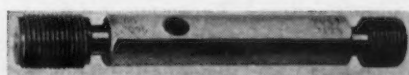


### Carboloy Plug Gages

**A**N improved type of Carboloy gage with segmented shanks has been announced by *N. A. Woodworth Co.*, Detroit. The segmented shank is said to compensate for the difference in the coefficient of expansion between cemented carbides and steel, thus assuring a trouble-free bond between these two metals. Carboloy gages range in size from 0.510 to 1.510 in. The segments separated by slots, permit "breathing" and allow for expansion or contraction resulting from temperature changes. Other Carboloy gages manufactured by Woodworth are cylindrical plug gages, master disks, concentricity gages, paddle gages and many other types of special gages.

### Carbide Thread Plug Gages

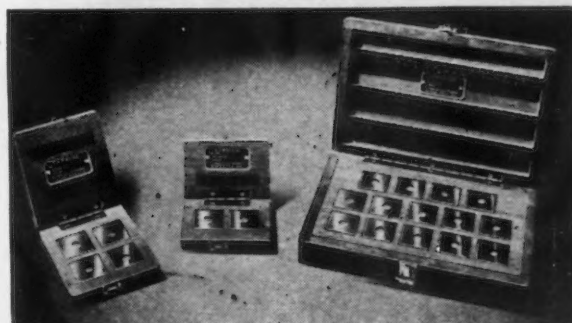
**A** LINE of carbide thread plug gages which are said to be accurate to exceptionally close tolerances has been announced by *Jansson Gage*



*Co.*, 19208 Glendale Avenue, Detroit 23. Three styles of carbide thread plug gages are offered. A complete size range is available from 0.112 to 3 in., ground to Class X or Class Y tolerances. Any pitch can be supplied in American National form.

### Carbide Gage Blocks

**A**SERIES of wear blocks to be used on the ends of a gage block build-up, Carblox cemented carbide gage blocks in the Hoke (square) type have been announced by *Lincoln*



*Park Industries, Inc.*, Lincoln Park 25, Mich. The blocks act as protective anvils, preventing wear on the less resistant steel blocks. Carblox are said to be practically non-magnetic and highly resistant to rust and corrosion. Hoke type Carblox are 0.950 in. square with 0.260 in. holes and are available in either "A" accuracy (0.000004 in.) or "B" accuracy (0.000008 in.) in sets of two 0.050 in. or 0.100 in., in sets of four (two each of 0.050 in. and 0.100 in.) and in sets of 14 varied sizes.



### Snap Gage Spindle

**A**N improved type of snap gage spindle, combining the features of snap and air-flow gages, for use with the Precisionaire instrument has been announced by the *Sheffield Corp.*, Dayton, Ohio. The spindle can be used on high finished or soft plated

parts without marring or scratching them and on thin-walled cylinders without any danger of collapsing them. It can also be used for checking work while in the machine and for checking parts of large size or unwieldy shape which could not be presented to the gage.



#### Comparator Gage

A DoALL comparator with four different ranges of modification has been announced by *Continental Machines, Inc.*, 1301 Washington Avenue South, Minneapolis 4. A work piece may be checked with a DoALL comparator to determine size variations of one millionth of an inch or size variations as great as 0.004 in. The comparator spindle is equipped with variable pressure adjustment and its movement is magnified electrically, assuring exact repeat readings since there are no moving parts which would cause the spindle to stick or bind. The gage head swivels 350 deg. in horizontal and vertical planes. The protractor provided shows the angle to which the gage is tilted. The gage head can be removed from the stand and used on a surface plate, machine tool or for any other special application. All DoALL comparators operate on 110 volt, 60 cycle current.



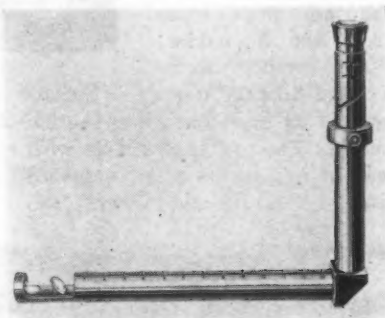
#### Bench Centers

TO maintain accuracy within 0.0001 in. in checking for runout, an improved portable bench center

has been announced by the *Sundstrand Machine Tool Co.*, Rockford, Ill. Precision checking of work between centers is simplified and speeded by one-hand control over all movable elements which leaves the operator's second hand free to control the part being checked. The center in the left

hand head is fixed but the center in the right hand head is spring loaded and can be retracted by the end bar for quick loading and unloading. The front clamp on the r.h. head locks the center in position during checking operation. A heavy ribbed base prevents deflection under clamping and unclamping. A dial indicator with an adjustable holder is

available as extra equipment.



#### Industrial Telescope

FOR internal surface inspection of bored engine shafts, tubular bodies, hydraulic and other cylinders, etc., *Polan Industries*, Huntington 19, W. Va., is manufacturing the Polan Borescope, an industrial telescope. The telescope will cover a diameter range from 13/16 to 9 in. and a bore length up to 30 ft. No special training is required to operate the telescope. A borescope, with right angle eye piece extension, is illustrated. The standard unit comprises a straight tube.

#### Angle Measuring Device

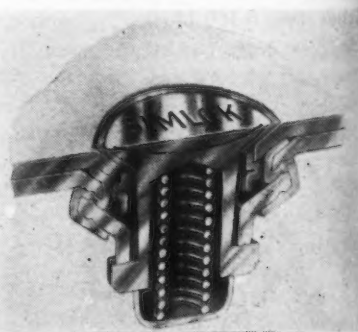
A TIME-SAVING device, called the Bemisine, for setting or measuring any angle from 0 to 90 deg. to accuracy within 1 min. of arc has been announced by *Nichols-Morris Corp.*, 50 Church Street, New York. This device requires only a 2 in. capacity micrometer and reference to the standard table of sines and cosines to determine and set any angle within its range in approximately a minute's time. Recommended by the maker for use with grinding and jig boring equipment, the Bemisine is a



multi-purpose tool room accessory in that it has provision for holding small workpieces for grinding, machining and inspection operations. Standard gage blocks may also be used with the Bemisine to determine angles.

#### Cowling and Panel Fasteners

AN improved line of Simlok fasteners for cowlings and panels has been announced by the *Simlok Div. of the Simmons Machine Tool Corp.*, Albany, N. Y. The Simlok device fastens or unfastens with a quick quarter-turn. When unfastened, the stud is self-ejecting so that it can be noticed on quick inspection. The fastener is manufactured with three types of studs—flush head, oval head and wing head, and comes in three sizes. It is claimed that the fastener completely eliminates side play and holds end play or spring deflection to a maximum of 0.008 in. The fastener is case hardened to eliminate wear.



#### Magnifying Lens

FOR close inspection work and assembly of small parts whenever additional magnification is required, an auxiliary lens, No. 05, which doubles the magnifying power of Flud-Lite magnifiers Nos. 701 and 701H has been announced by *Stanley Electric Tools*, New Britain, Conn. The lens is 2½ in. in diameter, is set in a cup-shaped frame and fits right under the lens frame of the magnifier. Each magnifier has a fluorescent day-light-lamp which distributes natural light over the object without shadow.



# BLAZING TRAILS IN THE SKY

## ROCKET SHOWN HERE AS SECRECY IS ENDED

### 50-Pound Projectile Was Used Effectively in Invasion

Details of an artillery type rocket projectile, classified heretofore as secret, and used effectively in the invasion of France and on other fronts, were made public yesterday.

It was described by C. Donald Dallas, president of the Revere Copper and Brass, Inc., who announced that the projectiles produced at the Rome Manufacturing Company Division of Revere at its plant in Rome, N. Y., were being delivered in tremendous quantities.

The rocket projectile is comparable in potency to the famous Army 105-mm. artillery projectile, Mr. Dallas declared. He pointed out that the principle of manipulation and firing of the rocket projectile was similar to that of the "bazooka," except that the rocket gun used a light mount. He said the range and destructive force of the new projectile were far greater than those of the "bazooka."

"Rockets fired from landing craft and 'ducks' can lay down devastating barrages against hostile beaches in landing operations," he said. "They can be fired in salvos from airplanes and water craft whose previous fire power has been limited to smaller sizes of ammunition. They can be loaded with high explosives or chemicals and they may be used effectively to lay down a smoke screen to conceal military operations from the enemy."

## Electric Welded Steel Tube by REVERE



Artillery-type Rocket Projectiles, which are being used with deadly effect against ground troops, ships, and even submarines, were developed by Revere at the request of and in cooperation with the U. S. Army Ordnance Department. The manufacture of these projectiles involved difficult research, the development of new principles of design, the application of new techniques and materials to withstand the terrific heat and pressure of the propelling charge. These facts have a real bearing upon your post-war plans.

We have been making electrically welded steel tube for 25 years. When war demands slacken, it will

once again be freely available for mechanical uses, boilers, condensers, heat exchangers, water and steam lines, and similar purposes. When planning to use steel tube, remember Revere's outstanding success with the electric welding process.

## REVERE

COPPER AND BRASS INCORPORATED

*Founded by Paul Revere in 1801*

Executive Offices: 230 Park Avenue, New York 17, N. Y.

# Assembly Line . . .

STANLEY H. BRAMS

**• Factional troubles in UAW impair settlements of wildcat walk-outs . . . Graham-Paige faces a hard road to auto resumption . . . Studebaker revises merchandising system.**



**D**ETROIT—The difficulty of operating factories whose workers are organized in a politically divided union has been brought home sharply this month by the strike of some 7000 Chevrolet Gear and Axle plant workers here.

This strike began late in July after a dispute over retiming of a slotting operation after a change in the processing. After the men walked out, the internal politics of the CIO United Auto Workers Union delayed their return. When the men finally did go back, five union local officials and two others accused by General Motors of leading the first strike were discharged. The workers thereupon walked out again, and the same hesitation in dealing with the affair was manifested by the union.

The reason for this hesitation stems from factional politics within the union and from the nearness of the annual convention of the UAW next month in Grand Rapids. At this convention a decided sentiment in favor of repealing the no-strike pledge is expected to come to the floor. That being the case, no international union official wants to put his foot down on the Chevrolet strike. Expediency is the rule of the moment; the forthcoming election is more important than the settlement of a strike.

The hesitancy of the international officials grows out of union politics. Two groups are struggling for con-

trol, as in the past. This year victory or defeat will be by a very narrow margin, and antagonism of the no-strike opponents could well be the margin of difference.

Walter Reuther, head of the General Motors division of the union, is faced with the most pressing threat to his position yet manifested in the UAW. His erstwhile supporter, Richard Leonard, Ford division head, has determined to run as his own candidate for a vice-presidency.

The way the wiseacres look at the picture, Leonard, Reuther and Richard Frankenstein, aircraft division head, will compete on the first vice-presidential ballot. With Leonard deriving most of his support from the Reuther wing, Frankenstein will likely win. Then Reuther will oppose Leonard on the second ballot. If the Leonard candidacy is as serious as it claims to be, his strength plus the anti-Reuther backing of the Frankenstein-George Addes wing might combine to defeat Reuther.

Whether General Motors had this in mind when it brought the Chevrolet situation to a head by discharging the seven leaders of the first walkout is an open question. At any rate, Reuther's position over an insurgent local certainly is a difficult one.

It is more evident that General Motors has definitely taken off its kid gloves in dealing with its labor problems. It obviously knew that the outbreak would flare up again when the seven strikeleaders were discharged. But it had precedent for its position, set by the General Motors impartial umpire, G. Allan Dash, last April when he upheld disciplinary measures against a group of Pontiac motor wildcat strikeleaders. This interpretation of the constitution made Dash's contacts with the UAW so difficult that he resigned soon afterwards, but that climax case and others did set a very solid precedent.


As a by-product of its action, General Motors also put the War Labor Board in an unsatisfactory position. In calling for an end of the first walkout, the Detroit WLB ordered all men back to work. The discharges occurred when the men returned. The Detroit WLB then took the position that its directive had been complied with and that the discharges were a separate affair precipitating a separate strike. The UAW, quite naturally, vehemently challenged this decision; in fact the labor members of the WLB called for investigation of the public members who acquiesced in it. The WLB, never admired by management, is on still shakier

**AXLE ASSEMBLY:** Workers put finishing touches on first heavy duty axles off the assembly line at the Madison, Ill., plant of the Standard Steel Co. The first shipment of these four and six ton axles was made less than four months after the plant was converted.





# Promise of Things to Come



**Postwar Planning.** This intricate set-up shows an experimental part mounted on a Tilting Rotary Table designed for use with the Pratt & Whitney Jig Borer. The part is set up on a sine bar positioned by P&W Hoke Precision Gage Blocks. The tilting and rotating features of the table enable the operator to check accurately the compound angle at which this hole (and some of the others as well) has been bored.

**A** MERICAN industry is going to school. It has been taking a post-graduate course since December 7, 1941. Under the constant pressure and well-nigh impossible demands of war production American manufacturers have learned countless new lessons.

Now, gradually, these lessons are being applied to the thousands of peacetime designs on engineering drawing boards as American industry readies itself for the gigantic change-over to post-Victory production.

Fitting inescapably into this over-all picture are Pratt & Whitney's scores of machine tools, small tools, gages and basic measuring equipment. These are the manufacturer's "right arm." Wartime demand for greater accuracy and still finer precision is carrying over to peacetime production . . . and Pratt & Whitney equipment is being relied upon for increasingly intricate set-ups like the one pictured here. In fact, an 84-year record of un-failing accuracy, swift adaptability, and solution of the most complex problems — has made P&W equipment invaluable in "the shaping of things to come." For any problem you may encounter involving machine tools, small tools, or gages, put Pratt & Whitney to work on it — with confidence.

## PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT



ground as a result of the Chevrolet episode.

AS anticipated, control of the Graham-Paige Motors Corp. was transferred last week to a group headed by Joseph W. Frazer, former president of Willys-Overland Motors, Inc. Brought along for consolidation in Graham-Paige was the Warren City Mfg. Co., whose presidency Frazer assumed last winter after leaving Willys-Overland.

Graham-Paige, said Frazer, will go back into the automobile business. The mechanics of this move, however, were definitely, perhaps necessarily, on the vague side. Designing of a new car will begin at once, probably through outside concerns, and tooling plans will be made. Hopes are to manufacture an engine at the Warren Avenue Graham-Paige plant; body sections, however, will be bought outside. At least a year will probably be required before any production is possible in this field. Meanwhile, efforts will be made to revive the farm tractor which Graham began to make in 1941 prior to the war. Plans also call for the output of a line of farm

implements to go with this tractor.

Obviously this will require money. It may be expensive for the group with Frazer—understood to include Floyd Odum, head of Atlas Corp., and definitely including other Atlas officials—to put as much into reconversion of Graham-Paige as appears necessary.

The Warren Avenue plant will require plenty of new tooling for automotive or farm tractor production. The Warren City plant, being brought into the fold, is in actuality a Navy plant. Frazer stated that this plant is under long term lease from the Navy and can be used as desired after the war, but it does not fit the automotive picture as it now stands. Its very substantial complement of machine equipment is admirably suited for manufacture of landing barges, now being undertaken, but not automotive units. It boasts many planers, flame cutting machines, and welding equipment, hand and automatic. But it has very few boring mills, only a small number of drills, few lathes and milling machines.

Then, after the plants are tooled, there remains the necessity of de-

veloping a dealer organization. On this score, Frazer would say only that, "when you have a hot car you can get someone to sell it in a hurry." His associates also said that numbers of calls had been received from all over the country during recent days asking for Graham-Paige franchises, but question may be interposed as to the qualifications of these would-be dealers, even in a seller's market.

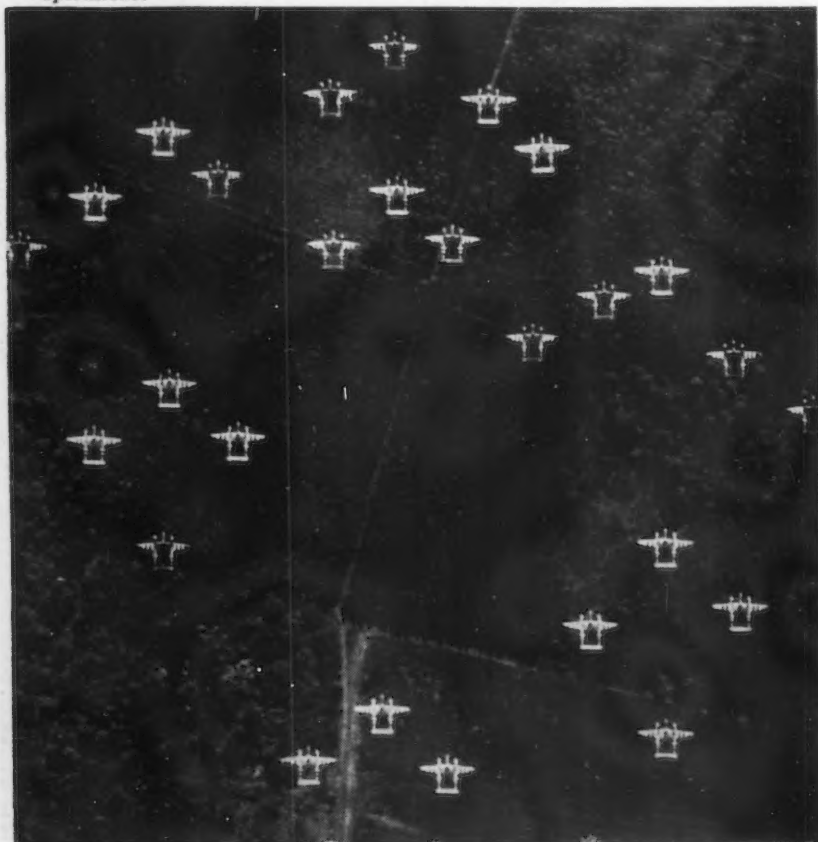
Of course, the Frazer syndicate may have other plans in mind. Machining facilities might be obtained by purchase of war plant equipment or war plants at a price low enough to put an entirely different change of complexion on the picture. Until the hurdles are passed, however, the sensational August price rise in Graham-Paige stock appears to have been actuated more by wishful public thinking than by basic facts.

NOT too significant as a general news item but of definite importance to the automobile industry is Studebaker's elimination of its distributor system of selling, in favor of a direct dealer system.

In more common merchandising terms, this means that the wholesaler has been eliminated. Discounts hitherto paid the distributor for cars he financed and passed on to dealers under him will henceforth be given entirely to the dealers. This will make Studebaker more competitive with the General Motors-Ford-Chrysler divisions.

With this program Studebaker has high hopes for its postwar future. Against average output of about 125,000 vehicles annually in the two years before the war, during which the small "Champion" was in the line, this South Bend manufacturer anticipates doubling that total to a level of 250,000, thereby undoubtedly increasing its proportion of industry sales. The company's plants are in good shape for reconversion, having been heavily engaged in truck manufacturing which maintained assembly facilities and machining installations, while aircraft engine work was concentrated in outside plants. The likelihood is that Studebaker will get off to a fast production start when the signal is given; and with the favorable reception accorded its new merchandising plan by both distributors and dealers thus far, the company may cash in on the enviable bank of industry and public goodwill built up during the war.

**FLYING PHOTOGRAPHERS:** Lockheed Lightning planes of a U. S. Army Air Force photo reconnaissance group, wearing their striped "invasion insignia," streak out toward the French Normandy coast to photograph D-day landing operations.





# These Easy-to-Fabricate Stainless Steels give your Designer a *Free Hand!*

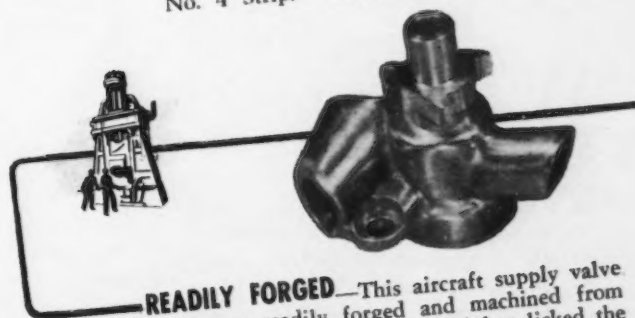


WHEN you start with Carpenter Stainless Steels in planning your new or redesigned products, your designer can take full advantage of their diversified properties and easy-working qualities. Carpenter pioneering has developed a wide variety of Stainless Steels. Today, they are meeting the critical demands of the aircraft, chemical processing, special instrument, and many other industries producing war equipment. There is a Carpenter Stainless grade for almost any job that may come your way.

Your nearby Carpenter representative can be particularly helpful to you in planning the use of Stainless Steels in your present or postwar products. Make use of his diversified Stainless experience to build longer, trouble-free life into your products and speed production in your shop.



**EASILY FORMED**—The smooth, rounded protective bead on this aircraft hose clamp was rolled the hard way—*along the grain of the metal*. No difficulty was experienced when the manufacturer went to ductile Carpenter Stainless No. 4 Strip. Production was increased, too.



**READILY FORGED**—This aircraft supply valve body was readily forged and machined from Carpenter Stainless No. 8. Stainless licked the problem of valve "sticking"—caused by corrosive high-octane fuels.



**SPECIAL PHYSICALS and FREE MACHINING**—This mechanical splint required accurate machining and high finish, plus resistance to corrosion, high strength and special hardness qualities. The combination of Carpenter Stainless grades No. 4 and No. 5 met all these requirements and helped reduce costs on finished parts.

The Carpenter Steel Company • 121 W. Bern Street • Reading, Pa.

## Carpenter STAINLESS STEELS



BRANCHES AT  
Chicago, Cleveland, Detroit, Hartford,  
St. Louis, Indianapolis, New York, Philadelphia

*...for*  
Strength  
Rigidity  
Heat Resistance  
Corrosion Resistance  
Longer Product Life  
Sales Appeal

# Washington . . .

L. W. MOFFETT

• Privately-owned machine tools frozen to war jobs despite surpluses of government-owned tools . . . Plan to substitute government - owned machine tools turned down by government agency.



**RECONVERSION PLANNERS:** Authors of opposing reconversion legislation, now causing a widening split in the Senate ranks, lunch peacefully in the Senate restaurant in Washington. They are (l. to r.) Sen. Walter George of Georgia and Sen. James E. Murray (right) of Montana.

**W**ASHINGTON — Automotive companies report that privately-owned machine tools are frozen to war jobs, even though surpluses of government-owned tools are in existence, despite recently issued WPB rulings that would otherwise permit some preparation for re-tooling to get underway.

One company, selected as a test case a standard machine owned by the company but being used on loan on a government contract. The machine is typical of those which are in "excess" stocks of the various procurement agencies due to cutbacks and cancellations. The company requested approval of a plan to substitute a government-owned machine.

This request resulted in an investigation of procurement regulations by the agency. It replied that since no new policy has been set up for the replacement of contractor - owned equipment with government equipment and so long as the contractor-owned equipment is capable of doing the job allotted to it, no substitution of equipment could be permitted. Further, the contention of the service is that such a substitution would "essentially be making a machine available for civilian production."

The Automotive Council for War Production which reported these facts to the Senate Military Affairs Committee declared that the company which received this statement of policy by the military service finds no fault with the "legal interpretation reached" by the service. But it ques-

tions whether the regulations of the service are consistent with public interest and the intent of Congress that preparation should begin for speedy reconversion and re-employment that does not interfere with production.

The statement reported a related example where some offers to buy specific items of surplus equipment under the price policy enunciated by the Surplus War Property Administrator have been refused by the military services on the basis that they must still adhere to an older price formula (in which lower rates of depreciation are allowed).

The Automotive Council asserted: "We recognize that this kind of incident may be attributable to a time-lag between announcement of SWPA policy and acceptance and promulgation of regulations to implement the policy by the services, but the problem is typical of some that must be removed before mass terminations occur."

The automobile men say that estimates are that termination inventories will turn out to be as high as 90 per cent scrap, with only 10 per cent of the material suitable for government use or sale to private industry. ACWP thinks the procurement agencies could classify and make disposal plans for this material now.

One company has 2,750,000 sq. ft. of floor space occupied by its own and government tools and equipment, a floor area equal to about 25 Yankee Stadiums. Another company will have

to move 100 acres of equipment, including huge presses, to make room for reconversion to civilian production.

**A** THIRD company has converted its entire 4,500,000 sq. ft. of plant space to making aircraft engines and has added another 500,000 sq. ft. of space since before Pearl Harbor. The industry wants to know which machines will be scrapped, which will be sold to it, and which the government wants to keep.

Lack of advance determination of the character and disposition of these inventories and machines "may risk unemployment on a wide scale for six months or a year after termination." The Automotive Council points out that while the contract termination law directs that contracting agencies move government property from plants within 60 days after inventory lists have been submitted by the contractors, this is a clearance speed that can be attained only after advance preparation by the government agencies.

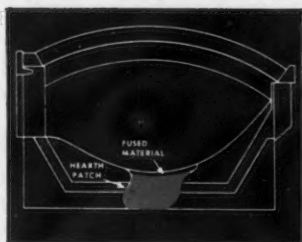
Even then, however, removal will be pending 90 days or more after termination because approximately 80 days might be required in many instances to get inventory records in shape for submission.

"The industry feels that we simply can't afford to lose that much time before commencing the clearance of



# Don't let them down

## Keep Open Hearths Going with HEARTH PATCH



"Don't let them down" is America's charge to industry, as our armed forces drive toward Victory. "Don't let them down" means keeping up ingot production, keeping open open hearth furnaces on the line.

How can an open hearth be kept on the line — when the bottom gets old, when deep holes show up? In many shops, the answer is Hearth Patch.

Hearth Patch is a fine-grained, fast-setting, magnesia refractory designed to do one job — to repair deep bottom holes. To patch a hole with Hearth Patch, just clean out slag and steel and dump in bags. Don't cool the furnace. Don't use any slag. Fill hole level full of Hearth Patch, cover with two inches of dolomite, and burn in for two hours. The patch settles down, fully consolidated and you're ready to charge.

Or if you can spare the time, you may, as some operators do, burn in Hearth Patch by the conventional method for fusing magnesite, to make an extremely dense, permanent type of repair.

Hearth Patch has been improved continuously since its introduction four years ago. Today it is outstanding among quick-setting refractories for its high degree of fusibility, refractoriness and stability. You can use it with confidence to prolong the useful life of old open hearth bottoms, when America needs every possible heat of steel.



**BASIC REFRACTORIES, INCORPORATED** *Cleveland 15, Ohio*

civilian plant facilities, a job which must precede retooling the plant to resume peace-time production and employment," ACWP said.

**T**HE industry says it needs advance decisions on what plant equipment will be available for purchase by contractors, and what equipment the government wants to retain, material available for purchase, and the method for removal of material and equipment. Other steps ACWP advocates are: Allocating storage space according to each contractor's requirements; the establishment of standards for indoor and out-of-doors storage; and the determination of the postwar status of facilities, whether they will be government or industry operated.

The anxiety of the automobile industry is understandable because it knows the magnitude of the problem facing it in changing over to passenger car manufacture. It is not saying, "Let us quit or decrease war production now." The industry is merely telling the government what must be done quickly to prevent the shift to peace from rivaling the cost of war itself.

## Dow Demands Government Controls Over Magnesium Be Removed at Once

Washington

• • • Charging that the Government was promoting future unemployment by refusing to remove its controls over magnesium and that the recently announced relaxing of controls was deceptive, Dr. Willard H. Dow, president, Dow Chemical Co., in an open letter to Donald M. Nelson, chairman, War Production Board, asked that the controls be removed at once to prevent the possible destruction of a vast potential industry. "Every day that the Government now delays in freeing the industry means a greater delay later on in providing employment."

"As matters now stand," said Dr. Dow, "the industry is entirely capable in the ordinary course of production of supplying all possible needs of the Government, either for domestic use or for export, and the stockpile is of such proportions as to give ample insurance against any kind of shortage. Therefore, as far as the needs of the war are concerned, there is no longer any reason to keep the magnesium industry under any form of control or allocation."

Dr. Dow declared that the order is-

sued by the WPB on July 15, 1944, had been represented to the public as removing controls over magnesium. "That is not true," he stated. "The order M-2-b, while it modifies certain controls over magnesium products, leaves the industry in essential respects under the same control as it was before."

In outlining the Dow Chemical Co.'s interest in the magnesium picture, Dr. Dow explained that when the war opened the company was the sole American producer of magnesium and had been for some years, for the reason that no other company had cared to take the risks and the losses of carrying on an industry which, although not new, was undeveloped. Dr. Dow stated that the Government eventually, through the Defense Plant Corp., expanded the industry from the 18,000,000 lb. a year which Dow was producing early in 1941 to a rated capacity in excess of 600,000,000 lb. a year.

Dr. Dow explained that recently the WPB made a series of cut-backs reducing the production to approximately 300,000,000 lb. a year, which reduction had been influenced more by manpower considerations than by costs of production. "There is already," Dr. Dow stated, "a large stockpile—running somewhere in the neighborhood of 100,000,000 lb. If the present rates of production be maintained, a stockpile of stupendous proportions may be accumulated."

## THE BULL OF THE WOODS

BY J. R. WILLIAMS



## Fluorspar Purchases and Sales Are Now Unrestricted

Washington

• • • Industry may resume unrestricted purchase and sale of metallurgical fluorspar, effective immediately, WPB announced Aug. 12. Some restrictions on fluorspar were lifted last spring. This latest action frees fluorspar for all purposes, including the metal industries.

WPB officials explained that the restricted shipping plan, designed to provide for the equitable distribution of the available supply of fluorspar, had been in effect since Jan. 1, 1943. As a result of producers' efforts to increase the supply, and more economical use of fluorspar by consumers, the situation has gradually improved until the demand and supply relationship is reasonably satisfactory, WPB officials said.



# THE FIRST STANDARDIZED AIR GAGE SPINDLES AND COMPONENTS

..... WRITE  
YOUR OWN SPECS!



Now—for the first time—standardized air gage spindles and components for checking long, short, through or blind holes at the gage or remotely at the machine or bench. You can write your own specs!

No more engineering time and charges! Deliveries shortened to a matter of days. Interchangeability of spindles and components enables adoption of complete air gaging program at minimum cost and minimum gage inventory.

No more GO and NO GO checking of internal diameters. Both tolerance limits are checked in one pass faster than either could be checked with a plug gage. Frequent, time-consuming and therefore costly, inspections of gages are eliminated.

Precisionaire spindles outlast plug gages 10 to 40 times.

No more human element of error when you use the Precisionaire. Parts with tolerances ranging from .005" to fractions of .0001" can be checked quickly by unskilled and untrained operators who merely present the gage to the part or vice versa.



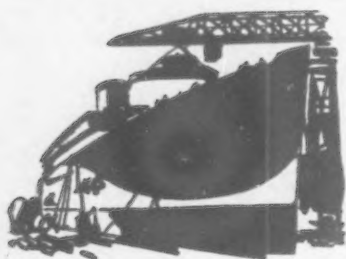
WRITE for Engineering Data No. 12 detailing STANDARDS and also showing SPECIAL applications.

**THE SHEFFIELD CORPORATION**

*Dayton 1, Ohio, U.S.A.*

MACHINE TOOLS • GAGES • MEASURING  
INSTRUMENTS • CONTRACT SERVICES

• **High-speed military conversions and immense new contracts for Pacific war operations continue to complicate manpower and scheduling, especially when workers and public elsewhere talk and think of peace.**



**S**EATTLE — With national aircraft interest concentrated on the B-29, and directly in the path of a \$100,000,000 new military and naval project program, the Pacific Northwest seems to be trotting its manpower feet just as fast as it can and yet barely standing still against the steady wind of the back-home and back-to-normalcy trend among war workers.

In a joint meeting between Army, Navy, business and labor representatives in Seattle a week or two ago, it was estimated that 37,000 workers are needed in the Puget Sound area immediately, 13,000 for new construction on military and direct war projects and 24,000 in the aircraft plants and shipyards. From the meeting emanated a program which specifies that civilian construction and repair jobs must be postponed indefinitely and that direct war and military projects will be graded in seven brackets. Neither Manpower officials nor labor organizations will supply workers to those in the second and lower brackets until the first is manned. All these jobs and projects are connected with Pacific operations and will not be affected by any change in the European situation.

When Todd-Pacific Shipyards at Tacoma (formerly Seattle-Tacoma Shipbuilding Corp.) was recently awarded additional Navy contracts totalling \$250,000,000 to build a new type of aircraft escort carrier, a new jam of shipbuilding backlogs spread

throughout all Oregon and Washington harbor areas. First plea was for 4000 new workers at Tacoma. Arrangements followed with other yards at Seattle, Portland, Vancouver and Everett for finishing operations and major subassemblies.

Todd officials declare they will keep a crew of 25,000 working for the next two years. Even after they let all the sub-contracts and finishing they can place, they still will have to do \$225,000,000 worth of work at their own yards on the new major craft.

Todd-Pacific at Seattle recently contracted to build two destroyer tenders costing more than \$30,000,000. This is in addition to commitments to build 20 destroyers. That yard has 18 months' work lined up at full capacity.

**B**OEING'S orderly, efficient change-over from the B-17 to all-out B-29 production at all Washington plants is proceeding according to careful schedule. Conversion has been planned and is being carried out without putting any worker out of a job and carefully hoarding every manhour. The Everett branch plant has been expanded and although at

present Boeing's plant in Wichita is turning out a greater number of Super-Fortresses, very soon production at Seattle and Renton with their satellite plants will be considerably larger. Nearly 70 per cent of parts for the Super-Fortress are either built at branch plants or by sub-contractors, and this is exclusive of props, engines and other components separately furnished by the Army. More sub-contracting is probably done on the B-29, believes Boeing, than on any other comparable airplane now in production.

Safety inspectors and operations men were proud last month, for 10 hydropresses in one shop pounded out two full years of production without a reportable accident. A few months ago a photo-electric safety device was installed on all presses so that if a worker moves within the danger zone while the press is in operation, the ram stops, reverses and raises to its maximum elevation. Beside the electric eye's automatic control, the press has dual manual controls, making it necessary for the operator to grasp with both hands. Women work on these presses along with men, often at top speed. On the 5000 ton press, women turn out 40 parts a minute.

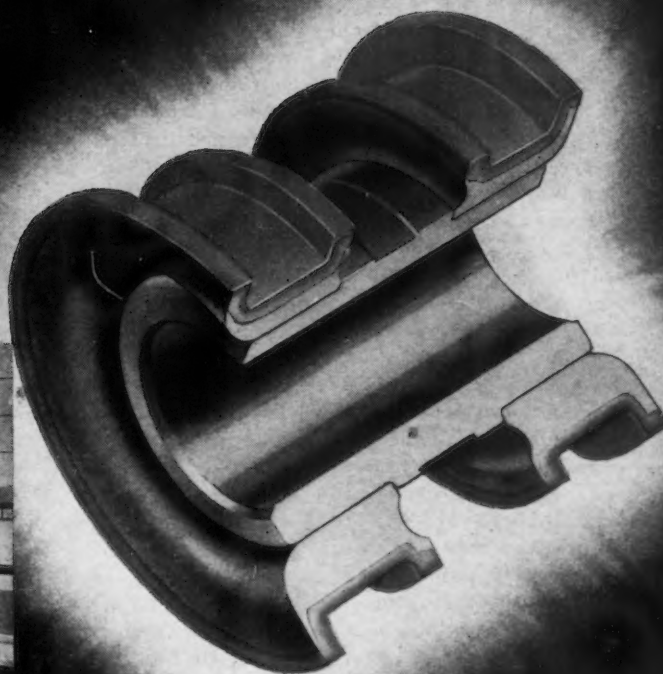
**GETTING THE JAP'S GOAT:** A pair of goats which survived the terrific Allied bombing and shelling on the island of Saipan is evacuated aboard a Coast Guard manned tank lighter. It is uncertain as to whether they will end up as "mascots" or mutton.



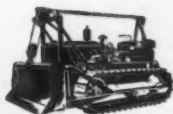


# HARD and FAST

TOCCO equipment for "Caterpillar" roller hardening and shrink-fitting. Duplicate installations are at Caterpillar Tractor Co. and American Car and Foundry Company.



## TOCCO *Shrink-Fits* AS IT HARDENS TRACTOR ROLLERS



The part shown above is a 90-lb. track roller assembly of the D-7 Caterpillar Diesel Tractor—a rugged war machine, famous on battlefronts the world over. This roller assembly... like many other "Caterpillar" parts... is TOCCO-treated for uniform high quality and speed of production.

At one push of a button, a TOCCO machine... of special design for this specific job... performs these three functions speedily, automatically timed to split-second accuracy:

1. TOCCO induction heats the rims of two rollers simultaneously, while the rollers ro-

tate, assuring a uniform amount and depth of heat. Total heating time: 2 min., 15 sec.

2. TOCCO'S special fixture mechanism pushes heated rollers on ends of hub.
3. TOCCO water quench hardens surface of roller rims to 50-55 R.C. and contracts rollers, shrink-fitting them to withstand a pull-off test of 90,000 lbs.

This speed and accuracy are typical of TOCCO operations throughout the production front of today... bright prospects for better products and lower costs tomorrow! Find out how TOCCO can improve *your* production. The booklet, "Results with TOCCO", is yours for the asking.

THE OHIO CRANKSHAFT COMPANY • CLEVELAND 1, OHIO



# TOCCO

HARDENING..BRAZING  
ANNEALING..HEATING



After five weeks operations of the new War Bond Tip Plan, 117 new hires resulted at Seattle and 81 at Renton. Seattle employees turned in 356 tips and at Renton 309. To every Boeing employee who recruits two workers a \$25 War Bond is awarded after the newcomer stays on the job for at least 90 days, and an additional bond is given for each additional acknowledged hire.

**L**OS ANGELES — Starting next Monday, Aug. 21, the 30,600 workers at California Shipbuilding Corp., Wilmington, will work two 9-hr. shifts instead of the traditional three. The 5200 graveyard shift workers will be absorbed by the day and swing shifts whose hours will be respectively from 7 a. m. to 4:30 p. m. and from 4:30 p. m. to 2 a. m. By thus spreading out available manpower over longer hours, the management expects to step up production 17½ per cent on its 30 troop transports. Under the new arrangement for 54 hr. actual work each week, journeymen on the day shift will be paid \$73.20 for 61 pay hr., and \$86.46 on the swing shift for 65½ pay hr.

Confusion and discouraging lost motion are involved almost daily in unexpected conversions and extremely urgent necessities in connection with Pacific military plans and operations. Recent major shifts in aircraft schedules have not relieved the pressure for production, but they have upset efficiency and timing. Within the past week at South San Francisco, Hammond Aircraft Co. gave notice to its 1200 workers that production would terminate during September as a sub-contractor for Douglas. Almost simultaneously, also at South San Francisco, Barrett & Hilp approached the end if its contract for ocean-going reinforced concrete tow barges at its

Bel Air shipyard and over 2000 workers would be free to fill in the yawning gaps in the personnel of other commercial shipbuilders and the Navy and dock establishments about San Francisco Bay.

Clarence E. Seage, consulting engineer from San Francisco, has been retained as full-time consultant with the Industries Committee of the Portland Chamber of Commerce in connection with its \$168,000 postwar reconversion period fund. Mr. Seage was senior bridge design engineer in construction of the San Francisco-Oakland Bay bridge and designed and supervised erection of the Oregon Electric Steel Rolling Mills at Portland.

AFL's Metal Trades Council won 932 votes against CIO's 874 in an NLRB election for exclusive bargaining rights at the Geneva steel mill. Out of an eligible list of 2272, 1838 votes were cast. Only 32 preferred no union.

In a membership questionnaire by the San San Francisco Chamber of Commerce, out of 442 firms who replied, only seven per cent had had assistance from the Smaller War Plants Corp. and only 16, or four per cent, answered "yes" to the question "Is the advice and assistance of a qualified government agent desired in the management of your business, such a service to correspond to that rendered to the farmer by the county agent?" To the statement "While many governmental agencies to control operations of the nation's business have been necessary for the successful prosecution of the war, at the end of the war business will be able to provide greater employment if governmental controls are minimized rather

than extended," 388, or 88 per cent, replied "yes."

C. A. Warden, Jr., vice president, Pacific Tube Co., Los Angeles, is now in charge of its executive administration and R. H. Gabel is vice president in charge of engineering.

Fred C. Angle, manager of Allis-Chalmers sales activities in the Pacific area, will henceforth manage all the company's field sales offices in the general machinery division.

James McClure has been appointed public relations representative for Allis-Chalmers Mfg. Co. in its Pacific region with headquarters at San Francisco. For many years he was in the same capacity with Pacific Gas & Electric Co. and more recently has been with the Army Air Service Command at Sacramento.

## Ex-Cell-O Claims Many Firsts in 25th Year Brochure

Detroit

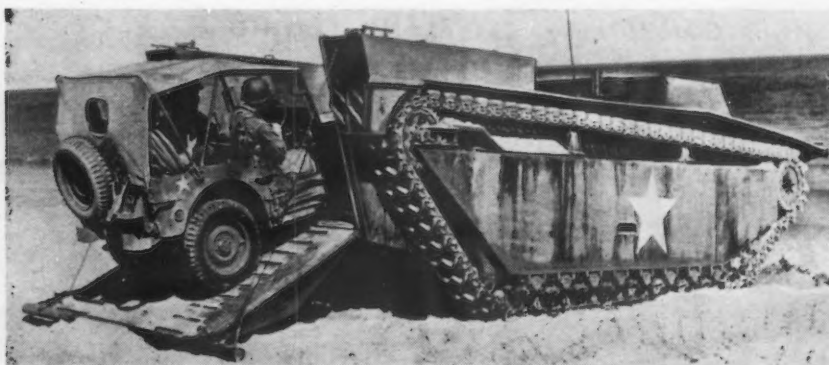
Ex-Cell-O Corp. has published an historical brochure commemorating its 25th anniversary, which took place in July. The booklet, titled "The First 25 Years," contains a chronological history of Ex-Cell-O, describes its various divisions, lists and portrays its executives, and enumerates the various products.

Listing the company's "firsts"; the booklet declares that Ex-Cell-O was the initial company in the United States to design and introduce precision ball bearing internal grinding spindles, horizontal type precision boring machines, precision thread grinding machines, precision cylinder boring machines, 1½ hp. compact hydraulic power units, diesel fuel injection pumps and universal type diesel engines nozzles, and machines to form and fill automatically square paper milk bottles in the dairy.

"Ex-Cell-O," the booklet goes on, "was also the first American company to undertake the mass production of hardened and ground precision parts for aircraft engines."

The booklet points out that five of the 23 original stockholders of Ex-Cell-O in 1919 are still active in the company. They include Phil Huber, president; Edward H. Hopson, superintendent of manufacturing, Diesel Division; George L. Buffington, in charge of estimating and process engineering; Charles Benker, in charge of plant maintenance, and J. H. Palmer.

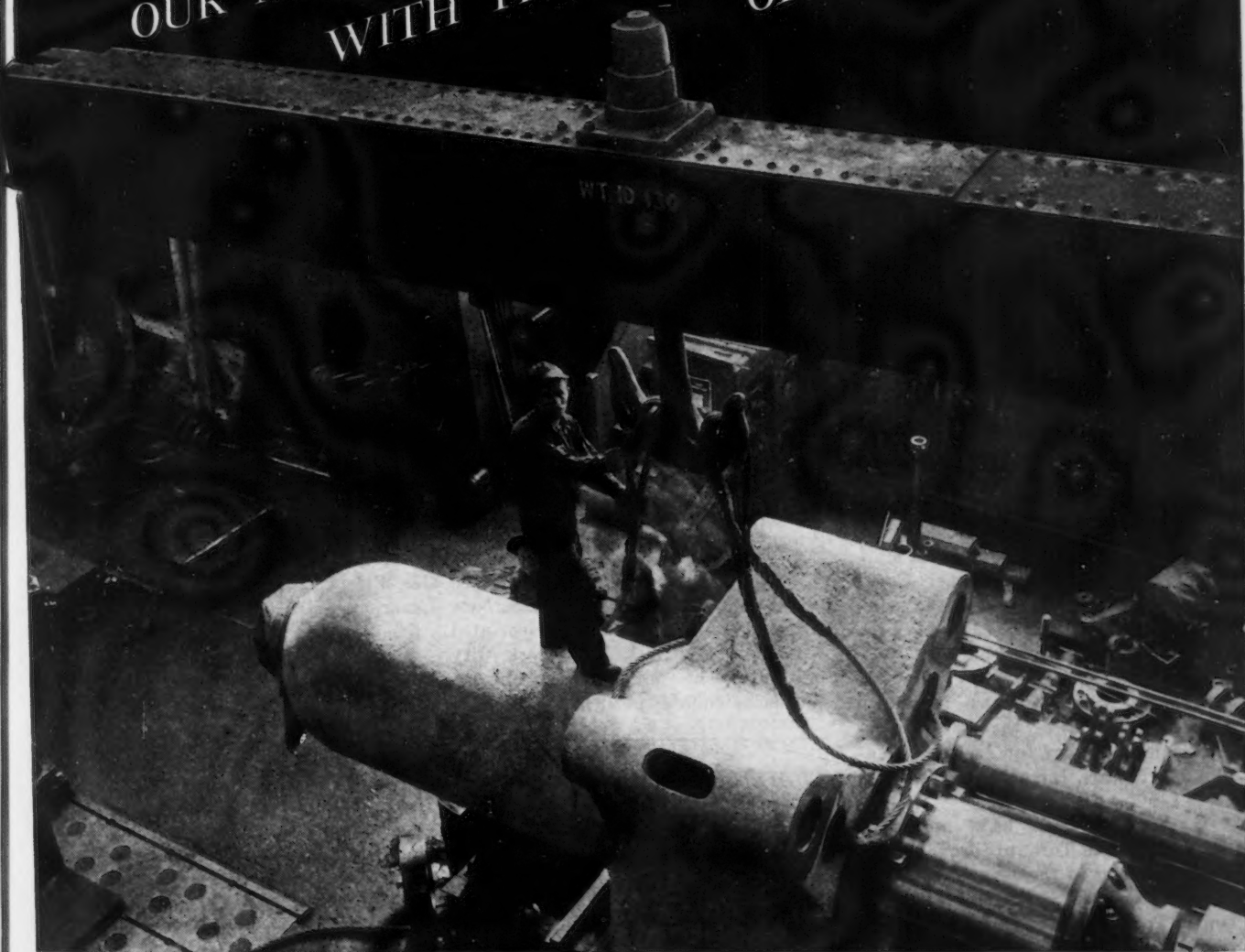
**WATER BUFFALO:** An Army jeep goes aboard a new type amphibious tank, the LVT-4, during trials at a Florida Army base. This ramp tank will carry 20 attack troops, and materials of war including a 75 mm howitzer. The new tank is built in the California and Florida plants of the Food Machinery Corp.





# ASK US IF IT IS HYDRAULIC

OUR MACHINERY IS BUILT IN ACCORDANCE  
WITH THE SPECIFIC REQUIREMENTS  
OF EACH CUSTOMER



## HYDROPRESS • INC.

ENGINEERS

CONTRACTORS

HYDRAULIC PRESSES • ROLLING MILLS  
STRETCHERS • PUMPS • ACCUMULATORS

570 LEXINGTON AVENUE • NEW YORK • N. Y.



**WILLIAM A. ANDERSON** assistant to the general superintendent, Carnegie-Illinois Steel Corp.

• William A. Anderson has been appointed assistant to the general superintendent in Carnegie-Illinois Steel Corp.'s Youngstown, Ohio, district. He has been Pittsburgh district industrial engineer of Carnegie-Illinois since 1935.

• Charles R. Hook, Jr., has been elected secretary and also assistant to the vice-president and general manager, Rustless Iron & Steel Corp., Baltimore, Md. He joined the company in 1937 and since 1942 has been assistant to the president.

• Guy E. Hairston has been appointed manager of the Atlanta district sales territory for American Machine & Metals, Inc., East Moline, Ill.

• G. F. Golby has been appointed manager of the Toronto branch office and warehouse of the Jessop Steel Co., Washington, Pa. He started with Jessop in Toronto in 1925 and from 1927 to 1929 was their sales representative in Pittsburgh. W. J. Henderson has been named manager of Jessop's Montreal warehouse.

• Harold S. Loomis has been elected vice-president in charge of engineering of the Union Switch & Signal Co., Swissvale, Pa. Leonard C. Ritterbush, formerly general sales manager, has been elected vice-president in charge of sales.

• Benton J. Sauppee has been appointed sales manager of the St. Louis district territory for American Machine & Metals, Inc., East Moline, Ill.

## PERSONALS

• • •

• Frank C. Moyer has been appointed general sales manager for Barium Steel Corp., Canton, Ohio. Mr. Moyer resigned as chief estimator and process engineer at Willys-Overland Motors, Inc. He has been associated with all branches of the forging industry for the past 40 years.

• A. Morton Cooper has been made manager of the general mill section of the Industrial Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

• Frank C. Angle, manager of Allis-Chalmers Co. sales activities in the Pacific region, has been appointed manager of Allis-Chalmers' field sales offices of the General Machinery Division.

• H. A. von Hacht, who has been for the past year the priorities representative at the Bridgeport, Conn., plant of the Heppenstall Co., has been made New York representative for sales, succeeding C. G. Singleton. Sidney A. Pfaff, well known in sales circles in the Twin Cities, has been appointed Minneapolis-St. Paul representative.

• John S. Black, Jr., has been elected secretary of The Stanley Works, New Britain, Conn. Formerly associated with Reid & Priest, New York City law firm, he joined The Stanley Works as counsel in 1943.

**JOHN S. BLACK, JR.,** secretary, The Stanley Works.



**M. J. BOHO,** assistant general manager of sales, Hagan Corp.

• M. J. Boho has been appointed assistant general manager of sales, Hagan Corp., Pittsburgh. He will assist D. J. Erikson, vice-president in charge of sales. Before joining the Hagan Corp. in 1936 as a sales engineer, Mr. Boho had been with Bailey Meter Co. and Potomac Electric Co.

• M. E. Capouch has been appointed assistant manager of construction material sales of the American Steel & Wire Co. for the Chicago district, succeeding O. T. Allen, who has retired. Mr. Capouch started with the company in 1926 as salesman of construction materials. Mr. Allen has been associated with the company in Chicago for the past 35 years.

• Byne B. Waters, formerly general secretary to the president, has been made secretary of manufacturing, International Business Machines Corp., New York. Harold Christensen succeeds Mr. Waters as general secretary to the president.

• C. W. La Pierre, who since 1936 has been in charge of the electro-mechanical sections of the General Electric general engineering laboratory, has been appointed assistant engineer.

• L. A. Bluck has been made lubrication engineer in the state of Michigan for the International Refining & Mfg. Co., Ltd., Evanston, Ill.

• John H. Gruver, development engineer, has been appointed to the newly-created position of products research engineer, Addressograph-Multigraph Corp., Cleveland.



• **J. W. Frazer** has been elected chairman of the Board of Directors of the Graham-Paige Motors Corp., Detroit. Mr. Frazer has been in the automobile business for 30 years. He was associated with the late Walter P. Chrysler for 15 years and rose to the top rank of the Chrysler Corp. In 1939 he assumed the presidency of Willys-Overland Motors, Inc., and resigned from the company in 1943. Oswald L. Johnston, a partner in the New York law firm of Simpson, Thacher & Bartlett and a director of several corporations has been elected a director of Graham.

• **Allen C. Chambers** has been appointed director of automotive sales of the Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. Mr. Chambers has served as Detroit manager of Bendix Products for the past 17 years. He succeeds Frank B. Willis who will assume full-time management of all Bendix Products war contract terminations.

• **Hunter Michaels**, sales manager, Railway Steel Spring Division and **Hugh Corrough**, division manager of Alco products of American Locomotive Co., have both been named directors of their respective divisions of the company. Mr. Michaels has been with the company since 1927, and Mr. Corrough since June, 1936.

• **R. L. Willis** has been appointed sales engineer of the Tocco Process Induction Heating Division of the Ohio Crankshaft Co., Cleveland. He was formerly assistant manager of sales of the Structural and Bar Division of the Weirton Steel Co. and prior to that was connected with the Bethlehem Steel Corp. for 15 years.

• **Frank E. Bodine**, Utah and Idaho representative for the Westinghouse Electric & Mfg. Co. since 1928 and manager of the Salt Lake City office since early 1941, has been transferred to San Francisco as manager of the company's San Francisco office. He will take over the San Francisco managerial duties heretofore handled by **Charles A. Dostal**, vice-president in charge of the Pacific Coast District. **Stanley M. Johns** has been named manager of the Salt Lake City office.

• **Stanley W. MacKenzie** has been appointed director of purchases of U. S. Rubber Co., succeeding **George M. Tisdale**, recently elected a vice-president and member of the executive committee of the company.



**MAURICE H. HOBBS**, manager of the engineering department of the Switchgear and Control Division, Westinghouse Electric & Mfg. Co.

• **Maurice H. Hobbs**, formerly manager of switchboard engineering, has been made manager of the engineering department of the Switchgear and Control Division, Westinghouse Electric & Mfg. Co. **Charles P. West**, formerly section engineer in switchboard engineering, succeeds Mr. Hobbs and **Wilbur C. Fulton**, switchboard engineer, has been made section engineer in switchboard engineering, succeeding Mr. West.

• **B. E. Strader**, director of sales for Remington Arms Co., Bridgeport, Conn., has been elected a vice-president. He will continue to serve as director of sales for Remington and Peters products, as he has done since 1935.

• **Robert B. Nuckols** has resigned as sales manager of the Standard Tool Co., Cleveland. He had been with Standard Tool since 1919. Mr. Nuckol's future plans have not been announced.

• **Arthur G. Green** has been appointed sales manager of Bay State Abrasive Products Co., Westboro, Mass.

• **L. F. Weyand**, formerly general sales manager, has been promoted to general manager of the Minnesota Mining & Mfg. Co.'s Adhesive and Coatings Division, with headquarters in Detroit.

• **Paul Torre** has been added to the staff of sales engineers covering the New England territory of the Foxboro Co., Foxboro, Mass.

• **J. Harry Christman**, vice-president, who has been in charge of Milcor Steel Co.'s Chicago branch since 1936, has been assigned new duties connected with special sales problems and merchandising policies. **Byron B. Barker** has been named to take Mr. Christman's place as manager of the Chicago branch. **Don L. Rossiter** has been appointed district sales manager of the Canton, Ohio, branch of the company. Mr. Rossiter has been one of the Ohio sales representatives of Milcor for many years.

• **E. J. DelVecchio** has been appointed field sales manager for the Progressive Welder Co., Detroit. Mr. DelVecchio was assistant sales manager of Taylor-Winfield Corp. before joining Progressive Welder. **Harry S. Rose**, formerly chief sales engineer, has been named sales manager for the Detroit district.

## OBITUARY...

• **George Mason, Jr.**, 63, retired vice-president of the Scully Steel Products Co., now the U. S. Steel Supply Co., died Aug. 5, in Chicago. He had been connected with the Steel Products Co. for 43 years prior to his retirement three years ago.

• **Frank E. Graper**, president and general manager of the Acklin Stamping Co., Toledo, Ohio, died following a brief illness, on July 20. He was 53 years old. A former plant manager of the Motor Wheel Corp. in Lansing, Mich. Mr. Graper joined the Acklin Stamping Co. in 1927 as work manager. He later became vice-president and work manager and in March, 1940, was elected president and general manager of the firm.

• **J. A. Schermerhorn**, works manager of American Welding Co., Carbondale, Pa., wholly-owned subsidiary of American Car & Foundry Co., died very suddenly August 3. He was 37 years old. Mr. Schermerhorn had given conspicuous service in the management of the Carbondale plant since this country has been at war.

• **J. Frank Hughes**, superintendent of the metal press department of the De Soto Division, Chrysler Corp., died Aug. 3.

# Fatigue Cracks . . .

BY A. H. DIX

## No Youth Worshippers We

• • • You may recall this paragraph in a recent *News Front*:

Machine tool builders have keenly felt the loss to the draft of men under 26. This is the age group where great initiative and versatility are found, industry spokesmen explain.

An anonymous Chicagoan scissored this and mailed it to us with a newspaper account of the collapse on July 29 of the Chester, Ill., bridge, which spanned the Mississippi. His comments, as is, are:

NO YOUNG ENG KNOWS WHY BRIDGE FELL DOWN. ALL MEN OVER 26 TAKE A SLAP IN FACE. LABOR HAS BEEN TAKING IT ALL TIME. SHIPS USED TO HAVE WROUGHT IRON BOTTOMS. WERE AND ARE FLEXIBLE. HOW LONG WILL STL BOTTOM SHIP SAIL. WILL CHYSTALIZE.

QUITE A FEW BROKEN UP ALREADY, BOYS 16 KILL GRANDPA OR GRANDMA QUITE COMMON NOW. WHY ANY AMERICANS SHOULD BE INSULTED I DO NOT KNOW OLD OR YOUNG.

IF ALL SUBSCRIBERS OVER 26 QUIT YOUR MAG HOW MANY WOULD BE LEFT.

This is unfair to us. The statement complained of is not an opinion of ours but is simply a report. *News Front* does not editorialize. The editorials are two pages farther front.

If all subscribers over 26 quit our mag we admit we would be in a bad way. In fact, the mag itself would quit, for this premature Oslerization would leave no one in the brains department but a few young ladies.

Nor do we relish being in the position of defending young grand-patricides and matricides. They should be taught courtesy toward their elders.

## No Passing Fad

• • • As to the steel ship matter, we refer our correspondent to our issue of Dec. 14, 1865, first page, sixth column, item headed, "What a Steel Ship Can Do and Suffer," from which we quote:

The steel clipper ship "Clytemnestra" weathered the disastrous Calcutta cyclone of Oct. 5, 1864. All its sails were blown from the yards. Bow and stern chains parted the ship from its mooring, causing it to smash through other ships (wooden). Several plates were driven in; but in no case was there a crack or fracture indicating brittleness.

The "Clytemnestra" did not make a drop of water and journeyed back to the Mersey with no further repairs than the ship's carpenter was able to effect.

The steel ship is here to stay.

## Trained Eye

• • • Tommy Fitzgerald, sports writer, reports that a young lady engaged in precision instrument manufacture protested an umpire's decision by crying, "You robber! He was safe by a thousandth."

## Caviar to the General

• • • The thinking of each of us is conditioned by experience. The young lady was inhibited from uttering the traditional exaggeration, "safe by a mile." When she marries, the easy tolerances of cookbooks—"from a one-third to a half tablespoonful of baking soda"—will dismay her.

And mark how the probable previous training of a *New York Herald-Tribune* correspondent in Guam is reflected in this dispatch:

Marines and the 77th Division captured some Jap territory and equipment, including an American-built water pump complete with gasoline engine, left in the town of Barrigada. The pump has a 12-in. stroke and was manufactured by Goulds Pumps, Inc.

Doubtless the reporter had an engineering background, causing him to conclude that the cable report would be of little value to the newspaper reader without data regarding the pump's approximate capacity and make. And, surprisingly enough, The *Trib* copy desk agreed with him.

## Sticks and Stones . . .

I have a candidate for your distinguished name club. One of the large windows in a building here at the center of the world bears the name J. Flipper Derricotte.

He is an attorney and I feel certain that when his name is announced he has at least two strikes on any jury.

—E. M. Lurie,  
WPB, Washington

Our club now has four members—Col. Oveta Culp Hobby, Dr. Icie Macy Hoobler, Dingle Mackintosh Foot, and, of course, J. Flipper Derricotte, who, as the newest member, becomes president.

## Orchid

• • • Inadvertently we let the first anniversary of *News Front*, the brains department's lusty infant (it was born June 3, 1943), pass without due and well-deserved ceremony, so we will let E. J. Mistler, Vice President of the Central States Copper Co., Newport, Ky., present the bouquet:

A feature we always look forward to is the *News Front* page. Here is factual information for mature readers who want sober data.

## Pots First, Shakers Second

• • • Speaking of sober data, we would like to spotlight this observation in the Aug. 3 Washington section:

. . . WPB spokesmen said that pots and pans would be produced before cocktail shakers. Why? There is probably enough excess aluminum to make both and it is expected there will be manpower enough to make both.

Pots and pans are likely more useful than cocktail shakers, although there are some who would disagree . . . Can it be said that a pot or pan is more essential than a cocktail shaker to a man who doesn't need a pot, but who does want to buy a cocktail shaker?

This bit of high-powered ratiocination by L. Wesley Moffett, our Washington editor, is questioned by T. Carlyle Campbell, our commercial editor, who holds that stewpots should come first, for while cocktails can be mixed in a stewpot, a stew cannot be made in a cocktail shaker.

He, T. Carlyle Campbell, further holds that a better cocktail can be made in a stewpot than in a cocktail shaker, being among those who favor the stirred, rather than the shaken, cocktail. While cocktails can be stirred in a shaker, the odds are against it, as shaking a shaker is an almost irresistible impulse, like tonguing a molar cavity.

The dice are yours, Moff.

## Stopper

• • • Why Bryant's Pancakes Changed Into Dough.—*Dresser Industries.*

## Puzzles

Last week's printer used 4107 pieces of type. Still another correct answer to the problem "Write 31 using only the digit 3 five times" is submitted by J. W. (Ingersoll-Rand) Foster:

$$\frac{3 \times 3}{.3} + \frac{3}{3} = 31.$$

Mr. Foster is also responsible for this metaphysical exercise:

If one-third of six were three, what would one-fourth of twenty be?



## "FAIRBANKS-MORSE SCALES—ARBITERS OF BUSINESS"



### There Can Be No Compromise!

There can be no compromise in any industry where fast, accurate, reliable weighing is a factor.

The decision of the scales must be final and absolute . . . with no tolerance for concessions or adjustments due to weighing inaccuracies.

Fairbanks-Morse Scales more than meet that demand. They are accurate. They are reliable. They

have been since 1830—when the first Fairbanks-Morse Scale was built.

Today, Fairbanks-Morse Scales are found in every type of industry. They are used not merely as scales, but as highly efficient production tools that speed operations and eliminate costly errors.

Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.



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DIESEL ENGINES  
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WATER SYSTEMS  
SCALES  
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FARM EQUIPMENT  
RAILROAD EQUIPMENT



# Scales

# Dear Editor:

## CLINE OF THE SEABEES

Sir:

Pictures of my husband and two machines he designed are in your June 29 article, "Have Huebner and Huffman Fix Something Up." My husband is Fred L. Cline of the Seabees in the South Pacific. I would like to have ten or twelve copies of this article. Will you send them C.O.D.

MRS. FRED L. CLINE  
129 W. Creighton Ave.,  
Fort Wayne, Ind.

● We ran out of copies of the June 29 issue and have been able to get only three sets of clippings, which we are sending without charge. Some of our readers may be good enough to clip their copies (pages 45-49) and mail to you.—Ed.

## HIPPOCRATIC OATH

Sir:

Your July 13 editorial, "The Hippocratic Oath for Engineers" is great. It tells forcefully what another war would mean, and deserves to be broadcast to the nation. Congratulations.

FRED A. MITCHELL,  
Chief Engineer  
Milwaukee Bridge Co.,  
3282 No. 34th St.,  
Milwaukee 10, Wis.

Sir:

Your admirable editorial on the Hippocratic oath for engineers reflects a thought that I advanced back in the early 1920's in competition for the Bok Peace prize.

My entry, "Organization of Scientists to Prevent War," was among those considered for final action and was published in "Ways to Peace," Scribners, around 1924.

It included engineers, chemists, physicists and other key technical personnel in the small but potent group where united international action could prevent any war of the type now being waged, and at least keep its terrors from reaching heights that might actually destroy civilization.

DR. S. P. WILSON  
Varnish Products Co.,  
5208 Harvard Ave.,  
Cleveland, Ohio

Sir:

I must say I like your editorials very much. They are very interesting. I must say, too, that they are the only trade magazine editorials I take time to read. I would appreciate receiving copies of the latest ones and in particular, "The Hippocratic Oath for Engineers."

C. F. AGERSTRAND,  
President  
Agerstrand Corp.,  
Muskegon, Mich.

## COLD TREATMENT

Sir:

Will you please send us copies of your Feb. 23, 1943, and June 17, 1943,

issues, containing articles on the cold treatment of metals.

P. W. CARR,  
Project Engineer  
Elastic Stop Nut Corp.,  
Union, N. J.

● We have no more copies of these two issues but are sending clippings of the articles. See also "Some Effects of Subzero Cooling on the Tempering of High Speed Steel," page 52, Mar. 23, 1944, issue, and "Subzero Treatment of High Speed Steels," page 52, Apr. 13, 1944, issue.—Ed.

## HARD STEEL DRILLS

Sir:

We want further information on hard steel drills, described on page 54 of your Feb. 26, 1942 issue.

J. R. CLARK,  
Tool Engineer  
Alabama Dry Dock and Shipbuilding Co.,  
Foot of Canal Street,  
Mobile, Ala.  
● Write to Black Drill Co., 5005 Euclid Ave., Cleveland.—Ed.

## HOT FORMED MAGNESIUM

Sir:

I have read with interest the article, "Hot Forming of Magnesium Alloy Sheets," by E. P. Resos of Consolidated Vultee Aircraft Corp., in your July 27 issue. If the article has been reprinted will you please send me two copies.

RALPH G. GILLESPIE,  
Head of Metallurgy Dept.  
Ford Motor Company,  
Willow Run Bomber Plant,  
3000 Schaefer Rd.,  
Dearborn, Mich.

● Reprints have not been made but two clippings have been sent you.—Ed.

## AIRCRAFT SURFACE PROTECTION

Sir:

Will you please send two clippings of the article, "Surface Protection of Aircraft Parts," page 74 of your May 18 issue?

T. P. HALL,  
Chief Development Engineer  
Consolidated Vultee Aircraft Corp.,  
San Diego 12, Cal.

Sir:

Could you supply us with clippings of the article, "Surface Protection of Aircraft Parts."

E. J. ELSON,  
Librarian  
Aluminum Company of Canada, Ltd.,  
Arvida, Que.

## WANTED: STEEL PELLETS

Sir:

We have the problem of trying to locate a manufacturer who is in a position to supply spherical steel pellets or shot in sizes .065-in. dia. or smaller. These do not have to be perfectly round or polished smooth.

We have contacted all of the steel shot and ball bearing manufacturers without success.

To your knowledge are there any other possible sources for pellets of this size?

A.R.D.  
● We know of no other supply source. Does any reader?—Ed.

## 'CONTINUOUS CASTINGS

Sir:

Will you give us the latest and most complete references on the continuous castings of metals?

H. W. ABBOTT,  
Director of Laboratory  
International Graphite & Electrode Corp.,  
Saint Marys, Pa.

● See the twenty-page study beginning on page 48 of the Feb. 24, 1944, Iron Age.—Ed.

## SCREW THREAD STRENGTH

Sir:

Inasmuch as you have no more copies of the article in your Aug. 2, 1940, issue, "Screw Threads—The Effect of Method of Manufacture on the Fatigue Strength," by A. M. Smith, please make a photostatic copy and bill us.

MRS. MARCEIL JOHNSON  
C. G. Conn, Ltd.,  
Elkhart, Ind.

● As the price of photostats is 50c a page and the article is six pages long, the cost would be \$3. This article is one of the chapters in the 180-page book, "Bolts, Nuts & Screws," published by Lamson & Sessions Co., 1971 West 85th St., Cleveland. You can get a copy for \$1 and thereby save \$2.—Ed.

## CENTRIFUGAL PIPE MACHINES

Sir:

Could you give us the names of a few manufacturers of machines for the manufacture of iron tubes and copper tubes by the centrifugal system.

J. GOSSNER,  
Manager  
Imperial Export Co., Inc.,  
44 Whitehall St.,  
New York 4

● Machinery for making centrifugally cast pipe and tubing is usually built to order but you might try the Centrifugal Casting Machine Co., Tulsa, Okla.—Ed.

## MACHINE TOOL PRIMER

Sir:

We are interested in procuring a textbook on metal working operations and understand from the Dean of the University of Detroit, that you know of such a book. Can you tell us where we can get it?

PAUL W. KAYSER,  
Supervisor of Training  
Walter Kidde & Co.,  
675 Main St.,  
Belleville, N. J.

● Doubtless you have in mind the "Machine Tool Primer," published privately by the Herbert D. Hall Foundation, 1060 Broadway, Newark. The primer is intended as a training manual for those who have never been inside a machine shop. Price of single copies is \$2, with discounts up to 40 per cent for quantities.—Ed.

## LITHOCOTE

Sir:

Can you tell me who makes Lithocote, a material for surface finishing?

B.A.  
New York, N. Y.  
● Not known to us. Is it known to any reader?—Ed.



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V. ABBOTT  
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**T**RANSPORTATION is taking a real pounding today, and that goes for Muehlhausen Springs, too.

On the functioning of these coils of wire rests, to no small degree, the ability of ships, planes, trucks and trains to keep supplies rolling.

The unfailing performance of these springs is no accident.

Into their design goes a lot of engineering.

Look at the valve springs shown above. Their design seems simple enough, but notice the variations in coil pitch and diameter. These are to foil that arch foe of high-speed mechanisms—vibration.

By adding a coil here, varying pitch there, or changing the spring diameter, Muehlhausen engineers raise the spring's natural vibrating frequency high enough that it will not be excited at normal engine speeds. Of course, the job isn't as simple as that—not mentioned are the hours of study and the precision testing. Engineering of this type is keeping supplies rolling in time of war—and it will keep 'em rolling in the post-war period.

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Division of Standard Steel Spring Company  
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To improve product performance, use

**MUEHLHAUSEN**  
**Designed**  
**SPRINGS**

# This Industrial Week . . .

- **Heat Causes Drop in Ingot Rate**
- **August Order Volume Ahead of July**
- **Civilian Manufacture Faces Hurdles**

**A** DROP in steel production occasioned by the heat and a high absentee rate, a heavy influx of steel orders despite news from abroad, and the lifting of the ban on civilian goods production by the WPB were a few of the highlights in the steel and allied industries this week.

Steel production this week as estimated by THE IRON AGE declined one point to 96.5 per cent of rated capacity. According to steel observers this decline, despite the manpower shortage, would probably not have taken place had it not been for unprecedented hot weather. The ability of the industry to maintain such an operating level is considered all the more important in view of almost insurmountable manpower and production difficulties.

The decline in raw steel operations comes at a time when practically all types of steel orders have been on the increase. Compared to the first 15 days of July, it is estimated that the corresponding August period indicates an order volume increase of as much as 10 per cent with some companies. The result of this factor has been to further delay or push back deliveries on many steel items.

With the air filled with reconversion talk as well as military successes abroad, it may be difficult for some industrialists or others to realize that the steel delivery situation for war items and essential civilian products is tighter than ever. Many observers in the steel and allied industries look upon the latest WPB order lifting the ban on civilian manufacture as more or less a plan of procedure at the present time. The entire workings of this latest and final order in the WPB pattern for reconversion for civilian industries is dependent upon the availability of labor and material. There seems little chance in the near future that steel will be available for this program except as it is obtained from surplus inventories. A further check on the program, even though the material might be available, is the question of manpower shortages for war industries and essential civilian endeavor. Until these groups are adequately supplied with labor there is little chance of anything but a mere trickle in the production of those items on which the WPB has lifted the ban.

**S**OME sources believe, however, that the War Department cutbacks in the aircraft industry will free a considerably larger number of workers than the War Department has estimated. Over the next 12-month period the War Department has indicated that more than 120,000 workers will be released. Some WPB officials, however, are said to believe, on the basis of their estimates, that as many as 300,000 workers might be released in the aircraft industry because of cutbacks by December of this year. If this latter estimate proves to be anywhere near true, the

country may be on the way towards a much easier manpower situation which consequently would greatly expand the possibilities of an accelerated civilian production movement.

On the steel front this week were reports that the gigantic shell program may be in for a temporary cutback. Any decline in requirements, however, providing the war in Europe does not end suddenly, would have to be made up subsequently. It is believed that at a WPB production meeting scheduled for Aug. 25 in Washington some action may be taken to cut the immediate requirements for shell steel. It is said that this situation has arisen because many new heavy shell plants have not come into production as quickly as expected because of the reported inability to get shellmaking equipment. The shell program materialized so quickly that equipment manufacturers have been faced with a terrific job of producing such items as presses, heating furnaces and other machinery needed to produce the required shells. By October the bulk of the shell production lines are expected to be in operation and steel requirements then will bounce back to the original schedule.

The flat rolled situation this week is in no better shape than it has been recently and the sheet carryover is continually mounting. Any effort to work off these carryovers by boosting sheet output would only result in plate carryovers increasing.

In some areas flat rolled buying is said to be cautious with a slight increase in cancellations. Mills are anxious to turn out every possible ton of steel before expected cutbacks later in the year materialize. Such an opinion, however, is predicated entirely on the belief that the European phase of the war will soon be over—an opinion which is still in the realms of speculation and is not factually supported by the heavy volume of steel orders, insistence of the armed forces for more production and the substantial backlogs now in the hands of steel and equipment producers.

**T**HE manpower shortage as well as the unavailability of material will probably cause a drop in domestic freight car production this year from an earlier estimate of 60,000 freight cars. Of current interest is a Baltimore & Ohio Railroad inquiry involving 17,000 freight cars and a Chicago & Alton Railroad inquiry for 15,000 cars. More important from the standpoint of the 1945 carbuilding program was the recent placement by the United States Army Transportation Corps of 24,660 standard gage freight cars, with various car builders.

This week's national steel ingot rate dropped one point to 96.5 per cent of rated capacity. Only districts to show gains in steelmaking operations were Pittsburgh, up half a point to 93 per cent and Youngstown, up one and a half points to 96.5 per cent. District



declines occurred in Chicago, down two to 99.5, Philadelphia, down one and a half to 97.5; Cleveland, down three and a half to 96.5; Detroit, down half a point to 100 per cent and the Western district, down one and a half to 90 per cent. Buffalo at 104.5, Wheeling at 94, Birmingham at 99, Cincinnati at 98, St. Louis at 106, and the Eastern district at 89 continued unchanged.

• **WIRE PRODUCTS**—The fact that orders from the Army for barbed wire may soon be cleaned up augurs a little better for the farm trade. In recent months the production ceiling on items used by the farmer, such as barbed wire and farm fencing has made it difficult for the farmer to get what he has needed to keep his acres in shape. It is expected that with the Army orders out of the way more steel will be allotted for the making of wire products most urgently needed.

• **AIRCRAFT CUTBACKS**—More than 120,000 workers in the aircraft industry are expected to be laid off in the next 12 months as the result of War Department cutbacks. It is reported that 20,000 workers have already been freed because of aircraft cutbacks. News of these cutbacks came on the heels of a feud between WPB and the War Department over the question of adequacy of military supplies. It is expected that this question may receive considerable airing in the future. Meanwhile there has been no disposition to take as fact rumors or speculation concerning the early ending of the European War and producers and WPB alike are in favor of full and complete support production wise to the Armed Services.

• **NE STEEL EXTRAS**—Carnegie-Illinois Steel Corp. this week issued a new list of extras for USS Carolloy, hot rolled steels. This new extra list includes the recent price changes on bars, bar-strip, billets, blooms and slabs of AISI and NE specifications, and also includes the amendments in composition and price to the NE series that were recently made by the WPB. This extra list, that covers both open hearth and electric furnace grades, is dated July 12, amending the company's list issued Oct. 15, 1942.

• **STEEL WAR SHOW**—"Steel Delivers the Punch," an Army war show run by the Industrial Services Division of the War Department, will hit the steel mill centers around

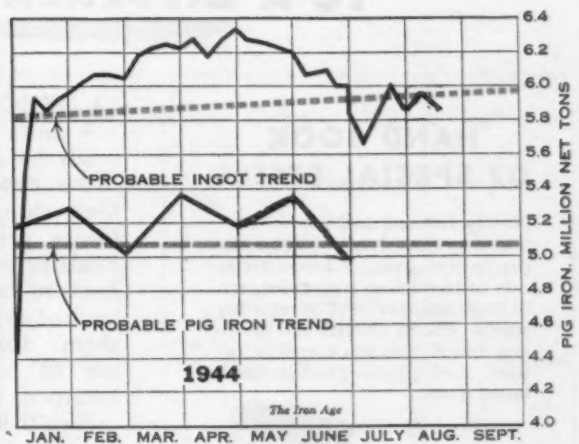
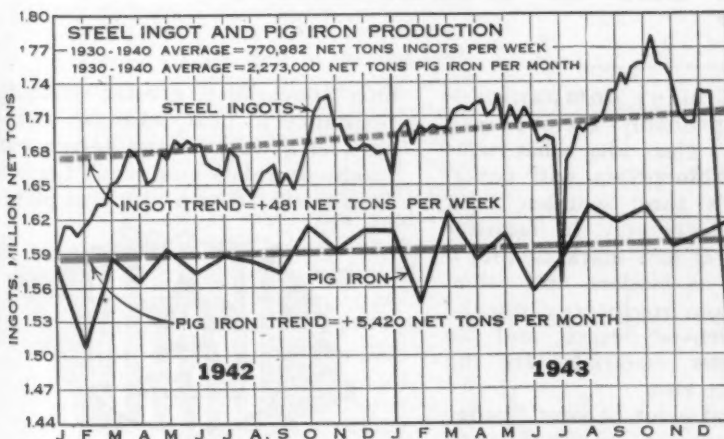
Pittsburgh beginning Aug. 21 in an effort to promote production, cut absenteeism, and enlist manpower in the mills. With about 250 men and 50 vehicles going through the paces of a sham battle and a series of dramatic sequences, the non-working population of the cities of Munhall, Homestead, Braddock, Clairton, Charleroi, Weirton, Youngstown, Sharon, Aliquippa, Brackenridge and Johnstown will see the part steel plays in the war and recruiting of help for the steel mills and foundries will be added.

• **STRIKES**—The honeymoon on strikes which for a short period followed news of the landings in France is over and according to reports on work stoppages the steel and allied industries are facing about the same number of work stoppages as was the case before the invasion. These stoppages are coming at a time when more and more emphasis is being put on getting out war material. As a matter of fact these stoppages are becoming so commonplace and so little is done by the union or the WLB to get the men back to work that industrialists who are charged with responsibility of getting out war work are privately disgusted.

• **IS SCRAP WOBBLY**—In many steel centers the scrap market seems to be marking time before some kind of a reaction sets in. Already the springboard is not being paid on good heavy melting grades at Pittsburgh while other districts like Philadelphia are reporting that heavy melting is being sold at below the OPA delivered prices. Turnings have been selling off the ceiling price at various times and in various districts. Most of this hesitancy in buying scrap and also the trend towards a break in prices seems to stem from a cautious inventory scrutiny by consumers so as not to be caught "holding the bag" in case the war in Europe ends suddenly. Furthermore the present situation has all the earmarks of "the old days" when lower prices were impending.

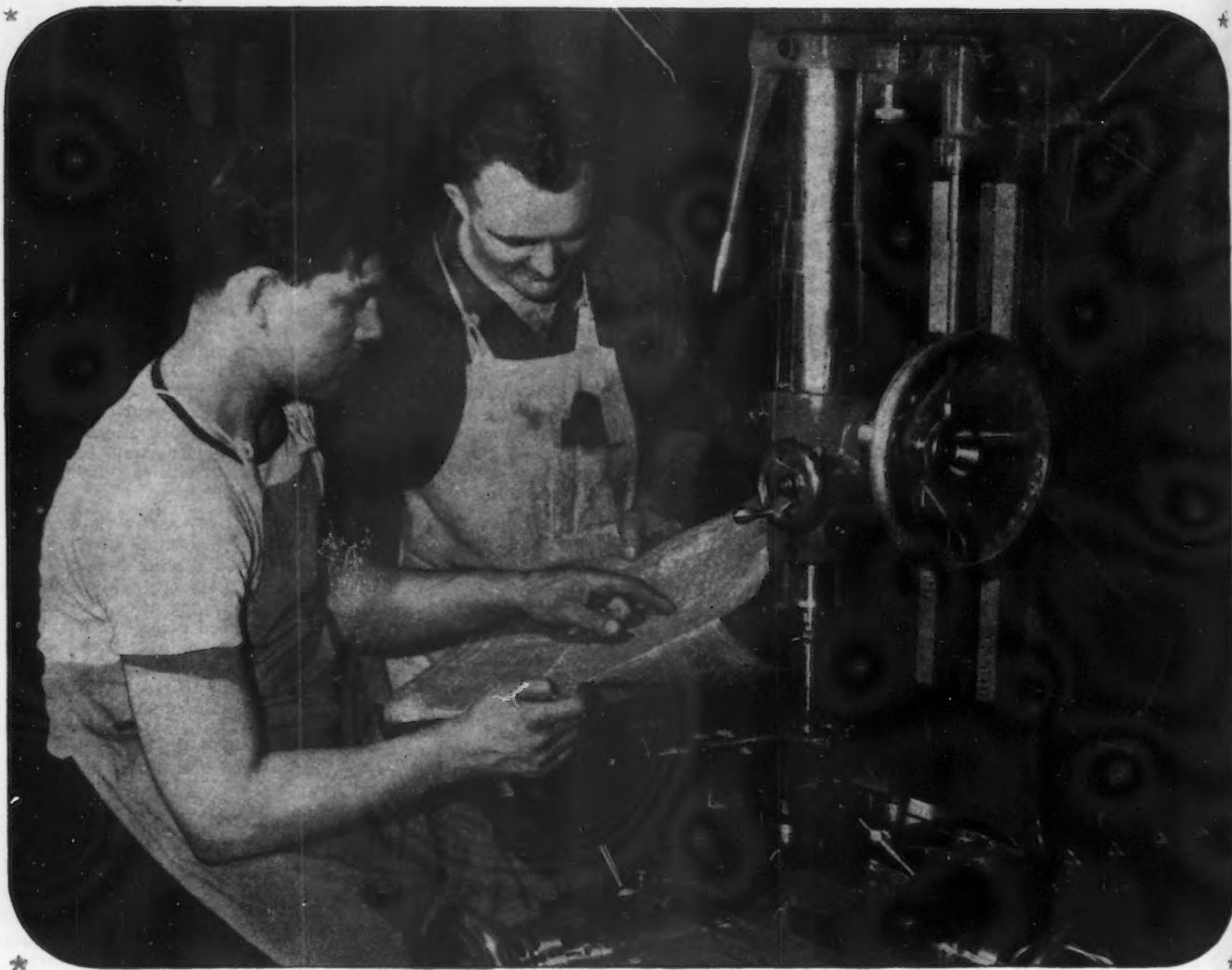
• **VICTORY BLAST FURNACES**—Uninterrupted production by five blast furnaces at the Indiana Harbor plant of Inland Steel Co. for more than four years has been completed, setting some sort of a record in continuous group operation of blast furnaces. The five stacks have been operating at maximum capacity since Aug. 6, 1940, when the No. 2 furnace was blown in. Each produces about 1000 tons of pig daily. A sixth furnace, blown in Nov. 16, 1942, with a 1200-ton daily capacity, has been operating steadily since that date.

## The Iron Age



## Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 8 . . . . .	92.5	101.5	95.0	99.0	100.5	104.5	94.0	99.0	100.5	91.5	98.0	106.0	89.0	97.5
August 15 . . . . .	93.0	99.5	96.5	97.5	96.5	104.5	94.0	99.0	100.0	90.0	98.0	106.0	89.0	96.5



*One of these Days* **THEY'LL BE WORKING**  
**TO A DIFFERENT SET OF BLUEPRINTS**

**HAND BOOK  
 OF SPECIAL STEELS**

Newly revised and reprinted—a comprehensive book on the properties, uses, and best methods of handling, treatment, etc., of tool, stainless and other alloy steels. Plenty of tables to facilitate quick reference and selection. 136 pages, pocket-sized, latest data.

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You'll find a lot of your "better materials" answers among the various Allegheny Ludlum families of special, high-alloy steels. If you're looking for such qualities as improved electrical characteristics,

finer appearance, greater strength, resistance to heat, wear or corrosion, etc., we have the design and production data you need. Let our Technical Staff help with your plans.



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**STEEL CORPORATION**

GENERAL OFFICES: BRACKENRIDGE, PENNA

W&D A-9330



# Alloy Steel Output Continues Its Decline in June

By TOM CAMPBELL

## New York

• • • Alloy steel output in June hit a low point in the war period since March 1942, when only 866,000 net tons were produced. This tonnage was somewhat below the average monthly output in 1943. Furthermore, the participation of open hearth furnaces in the production of alloy steel has been expanding recently at the expense of electric furnaces.

Before the war, open hearths accounted for about 77 per cent of the alloy steel output, but with the rapid increase in electric steel facilities this participation was gradually cut down to 61 per cent in December, 1943. Part of this change in the relative output was due to WPB orders in 1943 shifting alloy steel orders from open hearths to electric furnaces. However, when this order was recalled and a "free" market established the percentage of open hearth alloy steel to the total began to increase. In January of this year open hearths accounted for 64 per cent of the total alloy steel output. This trend continued until June when they were responsible for 66.5 per cent of total alloy steel output.

As to the relative position of total alloy steel output to total steel production, records for the seven months of this year indicate that alloy steel constituted 12 per cent of total steel output. At one time in the war period the percentage was as high as 17 per cent. According to a consensus in the steel trade there is little danger that alloy steel in relation to total steel will slip back to its prewar position but on the other hand most alloy producers do not believe the position held by alloy steel in percent of total steel output in 1943 can be maintained. Some observers believe that the postwar requirements for alloy steels will be such that at least one half the relative gain made by these steels in the war period will be retained.

That the trend in electric steel output seems to be sharply downward for the time being, except for possibly a temporary lift from recent tank and replacement programs, is evidenced by the operating rate for these furnaces in July which was 74 per cent of rated capacity. It was predicted

sometime ago in THE IRON AGE that not only would some new electric steel capacity be idle in 1944, but demand would be hardly enough to engage normal facilities which were already installed by private means. Reports in the trade this week bear out this previous contention. Furthermore, it is recalled that several electric steel installations sponsored by the DPC were shut down sometime ago due to lack of total demand.

This over-abundance of alloy steel capacity is eyed by some steel people as indicating the basis for price difficulties in the future. Whether or not such a condition develops remains to be seen, but with electric steel alloy grades commanding a \$10.00 a ton premium over open hearth alloy steel, the "makings" of a competitive situation are already in existence. Those open hearth alloy steel makers who have built up a good trade would be loath to let this business go to electric steel makers who have expanded their capacities. Likewise the latter will want to keep their equipment as busy as possible and with only so much market tonnage available it is apparent that in the postwar era "a good time will be had by all."

Probably of more importance in the months to come will be the disposi-

## Alloy Steel Production vs. Total Steel Output

1939-1944

Net Tons. 000 Omitted.

YEAR	Alloy Steel		Total Steel Production
	Pro-duction	Per Cent of Total Steel	
1939.....	3,212	6.1	52,799
1940.....	4,966	6.3	66,983
1941.....	8,206	9.9	82,839
1942.....	11,526	13.4	86,032
1943.....	13,116	14.8	88,873
1944—January.....	919	12.0	7,587
February.....	905	12.6	7,189
March.....	913	12.2	7,820
April.....	869	11.7	7,569
May.....	931	12.2	7,680
June.....	866	12.0	7,217
1944—6 months.....	5,443	12.1	45,062

tion the DPC will make of the alloy steel plants completed under its direction. The Chicago DPC Republic plant, which was set up as one of the most modern alloy steel plants, is now being used for the production of shell steel. The open hearths which were to have refined hot metal for the nine electric steel furnaces are now being operated separately on an open hearth practice. Two of the electric furnaces are in operation.

At any rate alloy steel figures furnish a tough challenge when it is realized that less than a year and a half ago electric steel operations were, for awhile, in excess of 110 per cent of the then rated capacity. July's rate of 74 per cent seems to speak for itself as to the adequacy of electric steel capacity.

## Trends in Alloy Steel Production—Open Hearth vs. Electric

1939-1944

Source—American Iron & Steel Institute. Compilation—The Iron Age  
Net Tons. 000 Omitted

YEAR	ALLOY STEEL OUTPUT				
	O. H.		Electric		Total Production
	Production	Per Cent of Total	Production	Per Cent of Total	
1939 .....	2462	77	750	23	3,212
1940 .....	3679	74	1287	26	4,966
1941 .....	5743	70	2463	30	8,206
1942 .....	8133	71	3393	29	11,526
1943 .....	9221	70	3895	30	13,116
1944—January .....	586	64	333	36	919
February .....	584	64	321	36	905
March .....	627	66	326	34	953
April .....	581	66	368	34	949
May .....	610	66	321	34	931
June .....	576	67	290	33	866
1944—6 months .....	3564	65	1899	35	5463

## War Needs Govern Steel Shipments With Shell Program Important Factor

### New York

• • • Steel shipments in June, according to the American Iron & Steel Institute amounted to 5,703,314 net tons compared with 5,859,786 net tons in May. However, allowing for the fact that May was a 31-day month while June was a 30-day month, the daily shipment average was about the same for the two months.

Most of the downward changes in the volume of June shipments from May can be attributed to the shorter

month. However some items declined a greater volume than was due to the difference in the number of working days.

For instance, shipments of rails in June were 174,556 net tons compared with 204,379 in May. Part of this decline was no doubt due to the effect of the shell steel program upon rail production. Many mills turn out rails on the same equipment which is used to make semi-finished shapes for shell forgings. It is expected that rail out-

put will be further effected in coming months for the same reason.

In the tubing category electric weld pipe and tubing shipments in June amounted to 82,054 net tons compared with 73,874 net tons in May, an increase of 8,000 tons. This increase may have been due to a greater demand for invasion tubing. Because of the rapid advances of the Allies in Europe it is expected that requirements for prompt delivery of invasion tubing will continue to be heavy.

Seamless pipe and tubing shipments in June were down about 14,000 net tons from May. This drop apparently reflects the inroads made on seamless mills by the shell steel program.

American Iron and Steel Institute Capacity, Production and Shipments

STEEL PRODUCTS	Number of Companies	Items	Maximum Annual Capacity, Net Tons	JUNE, 1944				TO DATE THIS YEAR			
				Production		Shipments (Net Tons)		Production		Shipments (Net Tons)	
				Net Tons	Per Cent of Capacity	Total	To Members of the Industry for Conversion into Further Finished Products	Net Tons	Per Cent of Capacity	Total	To Members of the Industry for Conversion into Further Finished Products
Ingot, blooms, billets, tube rounds, sheet and tin bars, etc.	46	1				732,000	241,888			4,276,070	1,351,444
Structural shapes (heavy)	10	2	8,977,450	300,839	41.4	297,850		2,028,924	46.2	1,979,506	
Steel piling	4	3		4,073		4,543		33,791		33,277	
Plates (sheared and universal)	23	4	15,990,020	1,092,703	83.3	1,075,178	65,404	6,954,131	87.4	6,760,377	301,123
Skelp	6	5				65,676	50,539	426,845		331,858	
Rails—Standard (over 60 lbs.)	4	6	3,625,000	171,528	57.7	174,556		1,155,559	64.1	1,148,885	
—All other	6	7	518,600	11,605	27.3	16,957		92,003	35.7	97,943	
Splice bars and tie plates	13	8	1,743,500	67,671	47.3	70,056		410,092	47.3	419,246	
Track spikes	10	9	350,640	12,380	43.0	13,795		74,401	42.6	79,575	
Hot Rolled Bars—Carbon	37	10		699,208		581,315	69,472	4,372,270		3,664,845	467,197
—Reinforcing—New billet	15	11		37,287		39,659		226,652		240,310	
—Reinforcing—Rerolled	15	12		5,994		4,924		43,863		48,491	
—Alloy	24	13		250,591		172,788	38,361	1,614,013		1,166,540	232,872
TOTAL	46	14	21,177,110	993,070	57.1	798,686	107,833	6,256,798	59.4	5,120,186	700,069
Cold Finished Bars—Carbon	26	15		140,066		141,888		905,528		902,611	
—Alloy	22	16		31,449		28,665		206,721		182,966	
TOTAL	32	17	2,700,650	171,515	77.4	170,553		1,112,249	82.8	1,085,577	
Tool steel bars	19	18	214,970	11,610	65.8	11,751		72,744	68.0	69,568	
Pipe and Tubes—Butt weld	16	19	2,289,130	114,760	61.1	121,026		714,170	62.7	707,683	
—Lap weld	8	20	987,900	44,721	56.3	46,306		296,689	61.6	295,579	
—Electric weld	9	21	1,225,170	84,363	83.9	82,054		391,440	64.2	388,030	
—Seamless	15	22	2,625,250	187,954	87.2	188,784		1,176,117	90.0	1,167,027	
—Conduit	7	23	184,500	5,688	37.6	5,165		26,521	28.9	27,304	
—Mechanical tubing	11	24	1,038,450	64,631	75.8	60,920		413,201	80.0	417,148	
Wire rods	25	25	6,883,170	370,611	65.6	109,821	29,225	2,228,302	65.1	632,429	169,268
Wire—Drawn	40	26	5,559,730	296,042	64.9	173,361	4,149	1,794,962	64.9	1,021,711	25,346
—Nails and staples	18	27	1,240,900	52,898	51.9	53,582		346,465	56.1	337,999	
—Barbed and twisted	15	28	546,230	20,831	46.5	20,878		127,595	47.0	126,545	
—Woven wire fence	15	29	1,110,200	31,880	35.0	32,645		192,805	34.9	192,480	
—Bale ties	12	30	150,660	6,328	51.2	6,434		40,285	53.7	38,965	
Black Plate—Ordinary	9	31				40,352	54			233,368	886
—Chemically treated	8	32	464,000	9,290	24.4	9,712		80,231	34.8	76,993	
Tin and Terne Plate—Hot dipped	9	33	3,719,650	176,072	57.7	192,116		883,359	47.7	965,911	
—Electrolytic	10	34	2,155,100	65,475	37.0	63,726		333,684	31.1	310,517	
Sheets—Hot rolled	28	35	20,137,200	1,022,132	61.9	506,666	19,769	6,264,989	62.5	3,170,865	126,157
—Cold rolled	14	36	7,318,780	309,899	51.6	167,234		1,819,883	50.0	1,003,169	
—Galvanized	15	37	2,681,130	114,162	51.9	114,315		634,650	47.6	627,891	
Strip—Hot rolled	22	38	8,519,590	224,857	32.1	139,675	20,654	1,337,245	31.4	851,999	139,582
—Cold rolled	34	39	3,267,470	108,411	40.4	97,417		589,204	36.2	550,933	
Wheels (car, rolled steel)	5	40	319,800	22,744	79.5	20,770		146,034	84.2	143,862	
Axles	6	41	416,170	14,806	43.4	14,566		105,661	51.0	101,699	
All other	5	42	172,290	4,315	30.5	4,188		20,958	24.4	21,079	
TOTAL STEEL PRODUCTS	154	43				5,703,314	539,515			34,911,141	3,144,733
Effective steel finishing capacity	154	44	64,722,000								
Percent of shipments to effective finishing capacity	154	45				97.2%				98.7%	



## WPB in More Liberal Policy Toward Civilian Goods

### Washington

• • • Subject to available manpower and materials, the War Production Board made effective Aug. 15 a more liberal policy on the manufacture of civilian goods. Because of the press of war production which is now taking the entire output of steel and many other metals it is problematical if the lifting of the ban on the production of civilian goods will have much of an immediate effect.

The production of the various items listed below are closely restricted by the latest WMC manpower directive and also by the fact that manufacturers must first obtain permission from the regional WPB office to manufacture these civilian items.

The latest WPB order is the fourth and final in a series directed toward eventual reconversion to civilian production. This order applies only to products covered by WPB orders by which the agency has controlled production and materials during the war.

Rules laid down by WPB by which plants now ready for reconversion may act on the latest order: 1. Permission to produce these civilian goods will be granted only if the changeover will not interfere with the production of war goods or essential civilian articles. 2. Labor and facilities must be available and must not be required for more essential purposes. 3. Where the proposed articles can be produced from idle, excess or frozen materials, more favorable consideration will be given the application. 4. Preference ratings of AA-5 will be assigned only for production of utility items important to civilians.

It is understood that late on Aug. 14 the WPB requirements committee found no steel supplies available for the immediate implementation of this program. As far as the manpower situation is concerned the aircraft cutbacks may eventually and not in the far distant future be the means of supplying some labor for the manufacture of civilian goods.

Commenting on the program Mr. Nelson said, "It is vital to arrange the machinery so that in the future when military demands decline or change, the men, the facilities and the materials which are set free can speedily be put to other uses."

Mr. Nelson further said, "for the time being it is not anticipated that any large increases in the production

of civilian goods will be possible. Supplies of steel and copper continue to be short and as a result little, if any, new production of these metals will be available for civilian goods output."

Priorities Reg. 25 will enable manufacturers operating under any of the orders covering the items listed below to appeal to the local WPB office for permission to exceed the restrictions or ignore them to the extent that labor, materials and facilities are available so that the new civilian production will not interfere with the war effort.

Regional offices with WMC concurrence will handle by application covering need for manpower equal or less than the following: 1. West coast, 50 workers; 2. WMC groups 1 and W areas, 100 workers; 3. WMC groups 3 and 4 areas, 250 workers. Where a manufacturer wishes to exceed these manpower ceilings, WPB Regional Office will send application to the proper WPB industry division at Washington for review.

Below are listed the items under the regulations which will be given

priority preference providing all conditions above are met:

L-5-c. Domestic mechanical—all items except electric. L-6. Domestic laundry equipment—all items except washing machines.

L-13-A. Metal office furniture and fixtures—cabinets, bathroom and utility filing cabinets, steel safes and safe deposit boxes, school furniture. L-18-B. Domestic vacuum cleaners—all items. L-23-B. Domestic electric ranges—all items. L-23-C. Domestic cooking appliances—all items and domestic heating stoves.

L-30-A. Galvanized ware and non-metal coated metal articles—ash cans, utility and wire picking baskets, coal hods, diaper pails, funnels, garbage cans, garbage can liners, oil cans in all sizes, pails and buckets, step-on pails, wash boilers, wash tubs.

L-30-B. Enameled ware—infants' enameled bathtubs, household coffee makers of all types not electric, cooking utensils of all types, sizes and materials; dinner pails, dishpans, double boilers, frying pans, covered kettles, household measures, dry and liquid; percolators, saucepans of all sizes, surgical and medical and veterinary instruments and equipment, tea kettles. L-30-C. Cast iron ware—cooking utensils, sad irons. L-30-D. Miscellaneous cooking utensils and other articles—can openers, step-on cans and liners, choppers, hand, food, meat, onion; clothes pins, diaper cans and pails, dish drainers, drip pans of blued steel, dustpans, eggbeaters, flour sifters, frying pans, wire garment hangers, insecticide spray guns, juice extractors, commercial and household; kitchen tools, lunch boxes, mop wringers, openers for bottles, cans, jars; dustpans, pans for household, baking, drip, pie, cake, roasting; not scourers, spatulas, spoons for basting, cooking, mixing, measuring, stirring; strainers for coffee, tea, food, fruit, vegetable, jelly; carpet sweepers, vacuum bottles, wash boards.

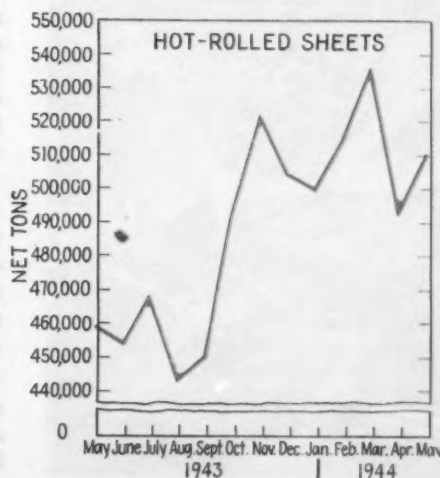
L-38. Industrial and commercial refrigerating and air-conditioning machinery and equipment—blood plasma equipment, cooler; evaporative, walk-in, water, reach-in, and refrigerated; display cases, frozen food dispensing equipment, home freezers, ice cream cabinets, air conditioning equipment. L-39. Fire protective, signal and alarm equipment—all items. L-49. Beds, bed springs, mat-

(Continued on Page 120)

## Hot Rolled Sheet Output Rises

• • • Hot rolled sheet production for sale in the first four months of this year ran ahead of the monthly average of the last seven months of 1943. In the latter period shipments fluctuated between 440,000 net tons and 500,000 net tons, excluding material shipped within the industry for further fabrication. Except for April of this year hot rolled sheet shipments

have been in excess of 500,000 net tons a month. Much of this gain reflects the increase in the landing mat requirements as well as the shell container program. The latter was started when a switch from paper and fibre containers became necessary because of corrosion of shells. Had it not been that these two sheet items were up top on the urgency list the pressure for plates may have forced an actual decline in sheet production for sale.



### Hot Rolled Sheet Output For Sale

May 1943 to May 1944  
Source, Amer. Iron & Steel Inst.

Month	Net Tons 000 Omitted
1943—May	460
June	455
July	469
August	444
September	451
October	493
November	522
December	505
1944—January	501
February	515
March	537
April	494
May	511

## Army Freight Car Contract Divided Among Various Producers

### New York

• • • While some sources early in the year had predicted a 60,000 domestic freight car year, it now seems apparent that the total will probably be slightly over 40,000 domestic cars. Ordering by the nation's railroads has not been as heavy as expected, probably due to recognized manpower and material shortages. Outstanding factor in this year's car construction program will be the completion of 39,500 cars for the United States Army.

Of current interest is the Baltimore and Ohio Railroad inquiry involving 17,000 freight cars divided by types as follows: 1000 50-ton hopper cars, 500 50-ton, 40-ft. 6-in. box cars, and 200 50-ton 50-ft. 6-in. auto box cars. The Chicago and Alton Railroad is inquiring for 1500 cars as follows: 1000 50-ton box cars, 250 50-ton hopper cars, and 250 50-ton gondola cars.

More important from the standpoint of 1945 car building activity has been the recent placement by the United States Army Transportation Corp. of 24,660 standard gage freight cars. American Car and Foundry will build 4590 units of the following types: 940 50-ton tank cars, 830 35-ton refrigerator cars, 1500 20-ton box cars and 1320

50-ton flat cars. General American Transportation Corp. will build for the Army 1000 20-ton box cars and 700 50-ton tank cars. Greenville Steel Car Co. was awarded 180 40-ton box cars, and 1170 cabooses. Mt. Vernon Car Mfg. Co. will construct 120 40-ton gondolas, Pressed Steel Car Co. 6700 20-ton gondolas, while Pullman Standard Car Mfg. Co. will furnish 8500 20-ton box cars and 1700 40-ton gondolas.

This 1945 Army contract will be fulfilled during the period from March, 1945, through December, 1945. It is said in some car building circles that freight car manufacturers, who are now busy with munitions as well as car building, are becoming apprehensive lest the volume of business in 1945 will fall off to such an extent that only partial operations may be possible. This view is believed to be the result of the recent dearth in the placement of domestic car orders. Some railroad sources, however, while not divulging the details, are forecasting a substantial and comprehensive passenger car building program as soon as wartime restrictions on men and material are changed.

## Report Shows Inventory Adequacy

### Washington

• • • WPB Chairman Donald M. Nelson took a step Aug. 10 toward a showdown with the military services on the need for certain procurement programs when he transmitted to the Joint Chiefs of Staff a report showing the adequacy of munitions inventories.

The question the Joint Chiefs must answer is whether war production can be taken from the bottom of the manufacturing horn and some civilian production put in the top. Congressional

committees are waiting for the answer.

Mr. Nelson's statement follows: "Some weeks ago a document was prepared by two of our capable statisticians, Lewis Bassie and Irving Kaplan, for insertion in one of the WPB's monthly Progress Reports, which are circulated regularly among top officials concerned with war production. These Progress Reports contain a great deal of secret material, and are never given general circulation.

"This document was a study which undertook to show the present position of Army ordnance supplies, as a whole and by a number of major categories, in terms of rates of issue and shipping potentials for troops overseas.

"When, according to usual procedure, the study was presented for advance review by the Army, there was a vigorous challenge both as to the accuracy of its presentation of facts and as to its general implications. While its authors were completely convinced that the study was objective and technically valid, there was considerable doubt in the minds of their superiors as to whether its facts and conclusions were clearly established. The document accordingly was withdrawn.

"In view of the Army objection and of the other doubts regarding this study, and in view of the additional fact that it has never been a part of the WPB's responsibility to determine the Army's requirements for munitions and equipment, which are given to us by the Joint Chiefs of Staff, I do not insist that the study be circulated.

**ABANDONED JAP SUPPLIES:** An American salvage detail sorts supplies left behind by retreating Japs during American invasion of Noemfoor Island, off New Guinea in the Pacific. In the center is the tail assembly of a Jap bomber.





## Middle West Experiences The Worst Manpower Shortages in Nation

### Chicago

• • • Slow to feel the full impact of war production, the Midwest is now experiencing the most widespread manpower shortages in the nation, the Federal Reserve Bank of Chicago reports in an over-all survey.

Little hope is held for alleviating the labor drought in the Seventh Federal Reserve District which includes Wisconsin, Illinois, Lower Michigan, Indiana and Iowa. The number of acute labor shortage areas designated by the War Manpower Commission stood at 24 for the district on July 1, 1944, the bank points out, more than one-third of the national total.

"Whereas the highest level in war production and employment in the nation today was reached during the final quarter of last year, Seventh District war activity has continued to expand," the survey continues. Relatively late conversion of peacetime industrial plants and some delay in new construction during the defense and early period resulted in substantial out-migration of workers from the Midwest to other war production centers, it is stated. As a result a large portion of the Midwest labor force had entered the armed services or migrated elsewhere when the region reached its most critical stage of war production.

The Gary-Hammond-South Chicago area where steel production is currently being hampered by labor scarcity has been almost continuously in the manpower shortage bracket since the beginning of the war. Elaborate recruitment campaigns conducted in rural and manufacturing centers in Indiana, Illinois and Wisconsin, have failed almost completely to uncover any new labor sources for the steel mills.

Chicago, itself, entered the Group I classification in March, 1944, and has since remained in this status. The regional war manpower commission here now is attempting to attract several thousand workers to foundries and forge shops, but trade opinion concedes that the WMC is pumping on a dry well.

Detroit, which occupied the lime-light early as a war arsenal, readily absorbed employment of the plants then producing automobiles, and ran out of manpower early in the picture. At no time in the past three years, has Detroit had excess labor supply,

and the Federal Reserve Survey states that "this situation is likely to persist until the European phase of the war is successfully completed."

Milwaukee, another war arsenal, has enjoyed labor balance throughout the war. The bank survey attributes this enjoyable situation to the fact that except for the armed services, there has been relatively little out-migration and enough in-migration from surrounding rural communities and gains in women workers to provide some margin of safety in the labor force. Also, expansion of some plants in the area has been balanced by cutbacks.

Indianapolis, which experienced manpower scarcity late in 1943 because of the growth of aircraft equipment manufacture, now has subsided into a state of labor balance with the

leveling off of production in that category.

Iowa, less industrialized than the other states, has had the greatest number of centers designated as surplus labor supply areas. Des Moines, which for a short period in 1943 had an acute manpower shortage, later was transferred to the labor surplus category and now is considered as a labor balance area.

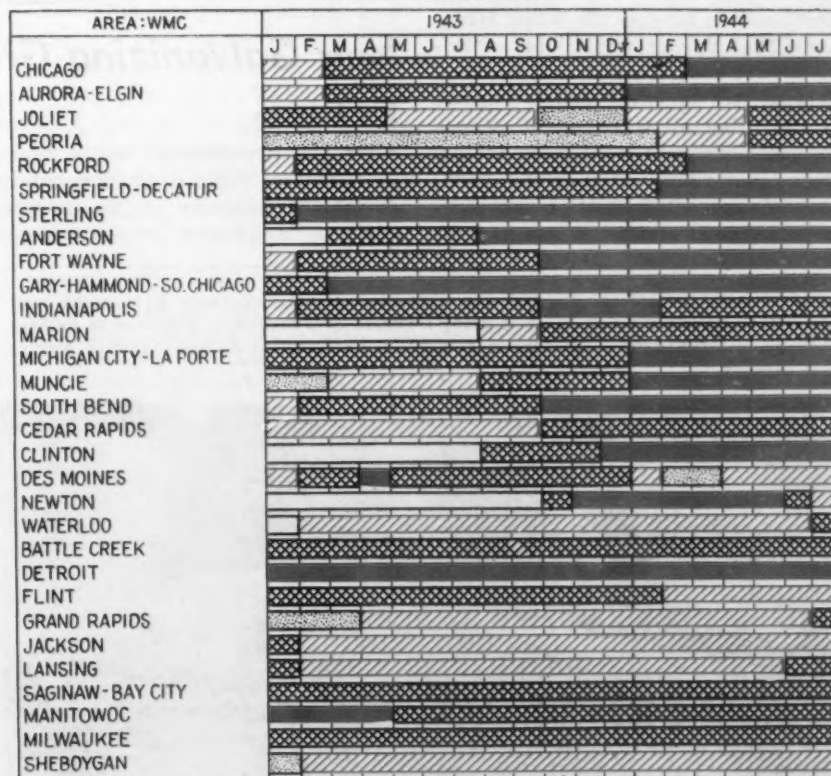
### July Steel Output Tops June by 260,000 Tons

New York

• • • A total of 7,474,297 net tons of ingots and steel for castings was produced by the steel industry during July, according to a report released by the American Iron and Steel Institute.

The July total was almost 260,000 tons higher than June production of 7,217,232 tons and also exceeded the total of 7,407,876 tons produced in July, 1943.

WAR MANPOWER COMMISSION  
CLASSIFICATION OF LABOR MARKET AREAS  
SEVENTH FEDERAL RESERVE DISTRICT I  
JANUARY 1943-JULY 1944



GROUP I  
AREAS OF ACUTE LABOR SHORTAGE

GROUP II  
AREAS OF BALANCE OF LABOR SUPPLY AND DEMAND

GROUP III  
AREAS OF ANTICIPATED BALANCE OF LABOR SUPPLY AND DEMAND

GROUP IV  
AREAS OF LABOR SURPLUS

NOTE: BLANK SPACES INDICATE AREAS NOT CLASSIFIED

## Believe Government Will Rule Over Industry During Reconversion

### Cleveland

••• It is now perfectly evident to industry, reports here indicate, that a form of Elite S. S. Guard has been established to rule over industry during the throes of reconversion. The "guard" will be made up of three committees, the Area Production Urgency Committees working hand in glove with the WMC Labor Priority Committees plus the sovereign reign of the Critical Area Appeals Board recently established by the Production Executive Committee of WPB. The whole fabric is implemented by the Byrnes manpower ceiling directive. The plan is conceded to be a plot to swing manpower and divert the pressure of industry away from immediate reconversion despite WPB relaxations.

Local analysis of the situation sizes it up this way: There will be no reconversion for some time in any labor area despite WPB relaxations of materials and limitations on production. WPB was permitted to go ahead with reconversion plan announcements because the White House knew that Byrnes would slap on this manpower control which is a National Service Act in effect and is capable of throttling all reconversion beyond the planning point. All areas despite their labor classification will be suppressed and all industries will continue under as strict controls as have

been applied at any time during the war. Postwar reconversion is termed dead here and bureaucratic control is thought to be at its highest stage of development.

Hope was at first held out that the loose labor areas (Class III and IV) might be permitted to resume some civilian production on a limited basis as a means of preventing unemployment in some of the less important industries.

This hope, however, is fading as the fact becomes known that production urgency committees for the first time will soon be established in even these labor areas and thereby control the flow of contracts, use of material, hiring of men and employment ceilings through the labor priorities committees of WMC and such vital utilities as power and fuel.

There has been little thought of reconversion in the Class I and II labor areas where employment ceilings are already being juggled to swing all possible workers out of non-

essential industry into war industry. Non-essential plants are having ceilings withheld to a bare minimum or reduced enough to drive workers elsewhere. Critical plants are getting some consideration for increased employment ceilings and are absorbing a few workers.

Knowing that this was the policy in tight labor areas, little in the way of reconversion has been anticipated in such areas but when even the loose labor areas are to be controlled it becomes perfectly evident to most industrialists that fully controlled reconversion is the word of the day and little progress in this direction can be expected soon. Industry considers the situation a joker when one faction of WPB waves the green light while another branch applies the air brakes.

Industry opposition is not expected to be very strong since the whole problem hinges about manpower shortages and the need to redistribute workers from area to area until war production is over. Industry as a whole, while straining at the traces to get back into peacetime products, is not believed so short sighted as to antagonize the present move beyond criticizing the muddle which conflicting directions is creating.

## New Galvanizing Group Formed

### Washington

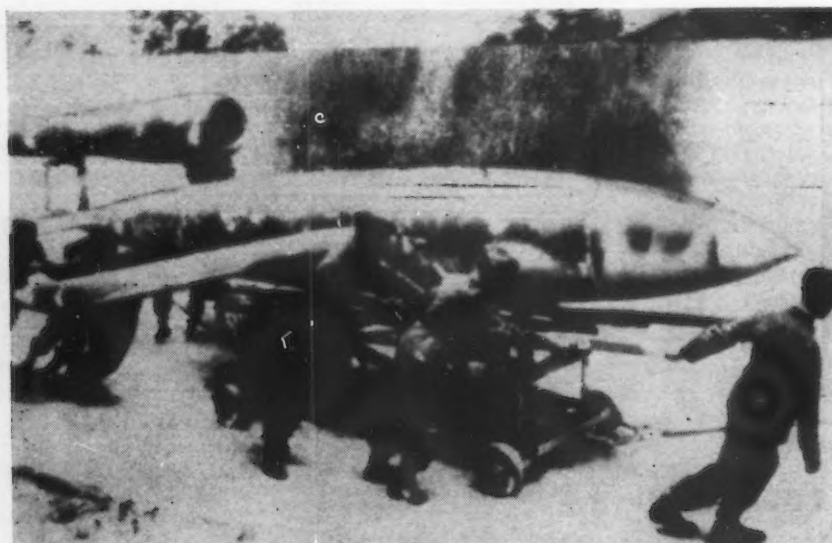
••• The appointment of 12 representatives of firms producing hot-dip galvanized products to an industry advisory committee was announced

recently by the Office of Price Administration.

The committee will meet with OPA at a later date for a discussion of pricing problems of the industry, made up of some 300 individual companies engaged in the production of essential military and civilian goods.

Members appointed to the industry advisory committee are: A. J. Blaesser, Joslyn Mfg. & Supply Co., Chicago, Ill.; G. I. Gregory, Thomas Gregory Galvanizing Works, Maspeth, N. Y.; R. B. Bolles, Commercial Metals Treating, Inc., Toledo, Ohio; H. W. Hake, Hake Galvanizing Works, Harvey, La.; F. C. Brightly, Jr., Standard Galvanizing Co., Chicago, Ill.; H. Hofkin, Penn Galvanizing Co., Philadelphia, Pa.; E. B. Byles, James Hill Mfg. Co., Inc., Providence, R. I.; P. Ingersoll, Wilcox Crittenden & Co., Inc., Middletown, Conn.; F. M. Carlson, American Tinning & Galvanizing Co., Erie, Pa.; W. H. McKenna, Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa.; K. F. Forsyth, Emsco Derrick & Equipment Co., Los Angeles, Cal.; and J. B. Tate The Witt Cornice Co. Cincinnati Ohio.

**OUTWARD BOUND:** The caption accompanying this German photograph says that a German flying bomb is being trundled to a launching platform to be sent against the Allies. Picture was supplied by Pressens Bilb, a Swedish picture agency.





## Army Breaks a Strike By Transferring Contract to Another

### Pittsburgh

• • • In a novel but quite bloodless manner, strike-breaking has been accomplished in the Pittsburgh area. Early Friday, Aug. 11, it was reported that the Army ordnance contract for fragmentation bombs with the Pennsylvania Transformer Co. had been cancelled because of a series of three strikes that had resulted in the loss of production of about 50,000 bombs. Samuel Horlich, president of the company, confirmed the report, stating that all materials and partially fabricated bombs, were being shipped out of company's two plants by government truck to the plant of another manufacturer, who was not named.

Immediately, the Army ordnance department in Pittsburgh denied that the contract had been cancelled. It was stated by an ordnance official that the Army was interested only in getting out the bombs and placed this responsibility in the hands of the company.

The company, with the approval of ordnance, had suggested and were carrying out the plan of shipping the material in private trucks to another plant but the contract was still in effect with Pennsylvania Transformer. Government officials, presumably Army officials, were quoted as saying that the cancellation was the first of its kind in Pittsburgh, and the contract will be completed at this other plant.

The ordnance department's denial, according to an ordnance representative, was refused by at least one newspaper on the grounds that to retract the original story in an early edition might have undesirable repercussions from the labor unions. However, no matter how the situation is considered, the transfer of the work, in addition to getting out the bombs for the Army, is a strike-breaking procedure.

The company has been very reluctant to comment on the matter, refusing to discuss it other than to say that it would welcome the strikers back to work. The refusal of the company to name the plant to which the job had been transferred on the grounds that it was "military information" seems to point to the possibility that the company fears that naming the plant might cause labor trouble at that point. When asked if such information was of a militarily restricted nature, ordnance officials

merely laughed. However, they likewise hesitated to put the finger on the plant that is taking on the work. By the hush-hush nature of the whole affair, with the company trying to lay the blame on ordnance and the ordnance department denying any blame in the matter, it seems that Pennsylvania Transformer Co.'s strike

news will be of public interest for some time to come, with the facts of the case being revealed in piece-meal fashion. This will continue the trouble with the union, and perhaps cause considerable further loss of production at the plant.

The strikes have resulted from a downward adjustment of pay rates by the War Labor Board, when it was determined by the board that rates were far in excess of the wage ceiling for the work on the bomb fabricating lines. Strikes occurred on June 28, July 17, and Aug. 3.

## To Hold Management Conference

### New York

• • • An eastern plant management conference, bringing together top management executives and foremen to promote harmonious industrial relations, will be held at the Sagamore Hotel, Bolton Landing on Lake George, Sept. 10-13 under the auspices of the National Metal Trades Association, it was announced last week.

Theme of the conference will be management functions of shop executives. It will be open to all NMTA member plants east of Ohio. A companion conference for the Middle West will be held later in Sept., exact time and place to be announced.

Indicating the scope of the conference, Joseph M. Schappert, director of industrial education of the NMTA and program director of the Lake George sessions, asserted that current developments on the industrial front

"will affect management-labor relations for years to come."

Chairman of the conference will be William L. Dolle, president of The Lodge & Shipley Machine Tool Co. of Cincinnati. Other conference committee members are:

A. L. Baker of Baker Brothers, Inc., Toledo; Howard Goodman of Goodman Mfg. Co. Chicago; J. L. Kopf of Jabez Burns & Sons, Inc., New York; Richard D. Lambert of the Worcester branch, NMTA; R. A. Mitchell of the Pittsburgh Forgings Co., Pittsburgh; G. K. Willis of the High Standard Mfg. Co., Hamden, Conn.; Earl S. Sparks of the Philadelphia branch, NMTA, and Louis W. Silvis of the Chicago branch, NMTA.

Assisting them will be C. L. Blatchford, secretary of the NMTA, and Clarence J. Uhler, director of industrial relations of the association.

**SHELL TORN ENGINE:** A group of Yanks of an Army railway operating unit examine a wrecked locomotive somewhere in France. The engine was blown completely from the tracks by aerial bombardment and turned completely around by the blast.



## War Department Cutbacks To Free 120,000 Aircraft Workers

### Washington

• • • More than 120,000 aircraft workers will be laid off in the next 12 months as a result of cutbacks announced by the War Department on Aug. 11.

The seven-state slash which will free 20,000 workers immediately, came within 24 hr. of the announcement by WPB Chairman Donald M. Nelson that a suppressed production

*It is reported that some WPB officials estimate that more than 300,000 aircraft workers will be released by Dec. 1 because of war department cutbacks.*

report had been transmitted to the Joint Chiefs of Staff for examination of the adequacy of military supplies.

The cutback announcement affecting the production of C-46 cargo planes, B-24 bombers, and the Corsair and P-47 fighters came as the secret report of WPB statisticians was sent to the Mead (Senate) Investigating Committee. The Committee has requested the presence of WPB Chairman Donald M. Nelson and Army Materiel Director Maj. Gen. Lucius D. Clay to reconcile the WPB report with military claims of production lags and manpower shortages.

These important cancellations had been rumored in trade circles for months and at WPB, officials said that the Army was not making the cutbacks because the War Department could not cutback and successfully defend its stand against the resumption of civilian production.

However, T. P. Wright, Director of the Aircraft Resources Control Office denied that there was any huge impending cutback of Army planes at the same time other WPB officials declared it was on the way. (See THE IRON AGE, July 20, page 101).

A Joint War Department-WPB report by the OWI revealed that more than 312 B-24's are being trimmed monthly from production schedules.

No estimates were available on the number of Thunderbolts or Corsairs which are being cutback. The reason for the terminations was said to be that the War Department wants to increase the output of very heavy bombers such as the B-29 and B-32.

Directly affected by the production change are the following communities: San Diego, Cal.; Dallas, Tex.; Akron, Ohio; Evansville, Ind.; St. Louis, Mo.; Buffalo; Louisville, Ky.; New Orleans, and Willow Run, Mich.

Hardest hit by the cutback was Higgins Aircraft Inc. of New Orleans which is not yet in production of the C-46. Its contract to produce 50 planes monthly was cancelled releasing about 6300 workers. It will continue to make wing panels for the C-46.

Production of P-47's at Evansville will be reduced to make room for the additional work from Akron, where the Goodyear Tire & Rubber Co. was making aircraft assemblies for Navy Corsair planes. It is understood that the Navy will cancel its contracts for Corsairs as they have been replaced by the Grumman Hellcat.

North American Aviation Co.'s contracts for B-24's will be cutback to make room for subcontracts from Southern California heavy bomber producers. B-24 output is also being sliced at Consolidated Vultee Aircraft Corp., San Diego, and at Ford Motor Co.'s Willow Run Plant.

In addition to the Higgins cancellation the rest of the cargo plane cutback will be absorbed by the Curtiss-Wright Corp., which will head for a schedule of 150 planes a month, and then taper off to 100 a month in mid-1945; and at St. Louis and Louisville will work toward a combined schedule of 50 planes a month instead of 108 a month previously planned for next year.

## No Increase Seen in Quota Of Wire Products for Farmers

### Pittsburgh

• • • Any hope of agricultural users of wire products getting such products in increased quantities during the remainder of the year is futile, according to observers in this area. The production quotas on barbed wire and wire fencing that have been placed on producers by WPB preclude any possibility of stepped up production of these sorely needed commodities. Furthermore, some producers expect that the fencing wire production ceilings that are in effect now will be cut rather sharply in favor of straight galvanized wire production that is in critical demand by the services.

Current production programs for barbed wire for use by the fighting forces are being worked off by most companies, and it is believed that when these contracts are filled, the number of new orders for this commodity will be greatly reduced.

While there has been no surge in demand for straight galvanized wire as yet, this is expected by steel producers within the next few weeks.

**QUENCHER:** A worker quenches a section of die steel from one of the high temperature hardening furnaces in the new research and metallurgical laboratory of the Jessop Steel Co., at Washington, Pa. The functions of the equipment in the room shown are those of experimental heat only.





## Detroit WPB Attempts Job Of Cutting Confusion on Redistribution

### Detroit

• • • A new approach to the problem of surplus redistribution is being attempted by the Detroit regional office of the War Production Board, one that promises to accomplish much more in the way of results than heretofore achieved, along with elimination of confusion and unnecessary motion.

Rather than simply keeping track of surpluses, sending out lists of available materials, and knocking on purchasing office doors without knowledge of what is wanted, the Detroit WPB office is going at the redistribution job from the standpoint of needs.

The first step in this process is the canvassing, now beginning, of approximately 1400 manufacturing concerns in the Detroit regional area to find out what steel, copper, aluminum and standard components they purchase day in and day out. Lists of this sort are being furnished WPB by the companies already contacted—all of whom have enthusiastically endorsed the new approach thus far—in compilations which seldom run over 100 or 150 items, even in the case of the largest.

As these lists come to the redistribution offices of the Detroit board, they are transferred to card files by

shapes, gages, sizes and specifications.

Then, as surpluses come into the offices they are checked against these indexes. The checker immediately knows whether there is a regular week-by-week market for the materials in one plant, several plants, or none at all. As supplies are paired up with requirements, telephone calls to the purchasing agents are made, and they are advised that a specified quantity of a material they purchase regularly is available. By taking this surplus, often at a more advantageous

price than mill or warehouse quotations, the load on such supplier sources is reduced and idle goods are put back into circulation and use.

Thus far approximately 100 firms have been contacted by WPB men working under R. F. Grindley, manager of the WPB facilities department at Detroit, and J. E. Adams, chief of the materials redistribution section of that department. Now that the plan is rolling it is expected that more than 100 firms a week will be contacted. Estimates are that of the 1400 firms in the Detroit area, close to 1000 will be in the production shop category, doing regular buying of basic requirements which will lend themselves to listing in the new WPB program.

## 500 Cancellations in WPB Program

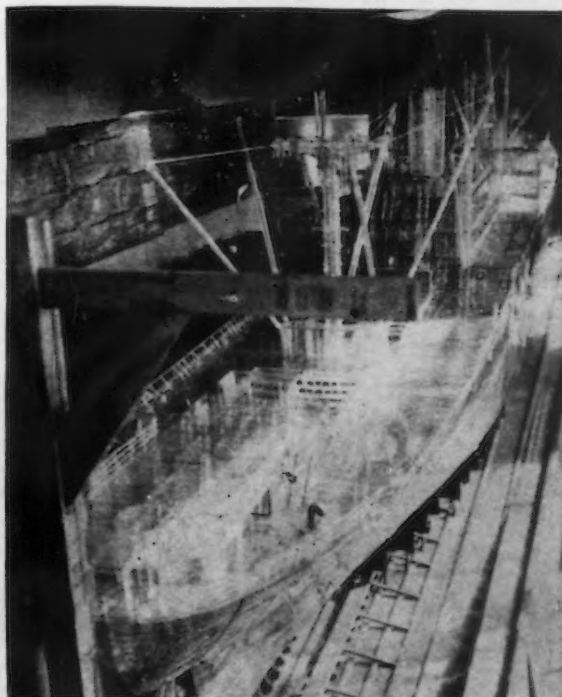
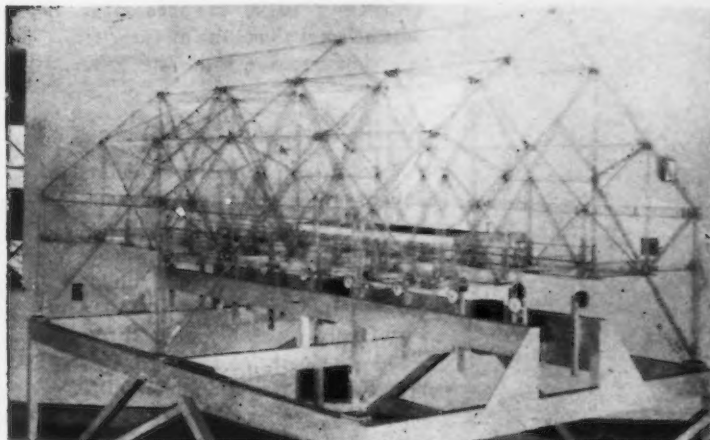
### Washington

• • • The WPB Program Bureau's "share the steel" check of carbon steel inventories, covering about 500 plants, has resulted in the cancellation of orders for 300,000 tons of carbon steel and the turning back of advance allotments for 200,000 tons running into the second quarter of 1945. Of the cancelled orders, approximately 200,000 tons represent third quarter cancellations; the remainder are for

the fourth quarter of this year.

These cutbacks are not regarded as significant at the present time. However, possible downward revision of military requirements will send such cancellations skyrocketing. In addition, WPB Program Vice-chairman S. W. Anderson expects an increase when an item-by-item inventory is completed by the mills which turned in their final reports on this first check on Aug. 7.

**NEW USE FOR PLASTICS:** Shown below is a Lumarith model of the structure of a towing tank used to test hydrodynamic properties of seaplane hulls and floats. It was built by the National Advisory Committee for Aeronautics at Langley Field, Va. At right is a Victory ship model, perfectly scaled 1 to 24 and constructed of transparent Lumarith sheets, rods and tubes. Lumarith is a product of the plastics division of the Celanese Corp. of America.



## Production Equipment Lag May Force Temporary Shell Steel Cutback

### Pittsburgh

• • • While no cutbacks are in sight on the production program for heavy shells, some steel producers are of the opinion that their September production requirements of steel going into these items may be lessened somewhat from the requirements of August. This, will, of course, not be known until after the WPB production meeting on Aug. 25, when September production schedules will become definite. Until that time, all consideration of the matter is speculative.

The reason for any slowing down of shell steel production, if it comes, is the fact that shell production equipment has not come into operation as fast as was at first believed possible. This inability to get shell production

rolling on schedule has not necessarily fallen into the category of one or two shell sizes, but is pretty general throughout the heavy shell program. Steel producers have been basing their speculation of a minor and temporary cutback in shell steel production on questions asked by the WPB pertaining to what could be scheduled if there was a slight withdrawal of shell steel from mill schedules.

There has been a definite effort on the part of shell producers with lines already in production to up the production of these lines without adding new facilities. This has been accomplished to a rather remarkable degree by some shell manufacturers by the alteration of tooling equipment, such as draw bench rings, piercing mandrels, and liners. These alterations,

while minor, increase the work life of such equipment, and by decreasing down-time helps increase production. One manufacturer of such equipment claims that the normal life of some of these items has been increased between 30 and 40 per cent by alterations in design and the material used in their manufacture.

While there may be some curtailments in September production of shell steel, this is taken as only a temporary measure to prevent the accumulation of this steel at a time when the demand in all phases for steel is so critical. By October, it is believed that the bulk of the shell production lines will be in operation, and then steel requirements will be back up to schedule. In fact, because of a possible slow up in September, there may be an effort by the WPB to make up any loss of production before the end of the year, so that 1945 production schedules can be started with little or no backlogs from 1944.

## Details of New P-63 Fighter Revealed by AAF Materiel Command

### Wright Field, Ohio

• • • The new P-63 Kingcobra, the War Department announced recently, is essentially a heavier, more powerful version of the famous Bell P-39 Airacobra.

The Kingcobra has been "in the works" for a number of months. It was developed by AAF Materiel Command engineers to provide a heavier and better fighter than the P-39.

Though it differs only slightly in appearance from its Airacobra for-

bear, the P-63 is about 700 lb. heavier than the 7650 lb. P-39 and has a wing span of slightly over 38 ft., a four-foot increase. The chief change is in the power plant. The P-63 has a two-stage Allison, 1500 hp. engine which gives greatly increased power and speed over the single-stage Allison which powers the P-39. The two-stage engine gives higher compression through the use of a fuel supercharger geared at one speed for medium altitudes and at a higher speed for high altitude flying. The

horsepower increase is rated at 300 hp.

Instead of the three-bladed propeller used on the Airacobra, the P-63 is equipped with a four-bladed prop, another factor which puts the new ship in the close to 400 mph. class. Its service ceiling is 35,000 ft.—an increase of 5000 ft. over the P-39.

Another development added to the Kingcobra by Materiel Command engineers is the laminar-flow wing, a development which gives the airplane better lift and maneuverability. The P-63 carries a 37 mm. cannon firing through the propeller hub and four .50 caliber machine guns, two installed in the wings and two in the nose firing through the propeller arc.

To give the P-63 added range, dropable belly and wing tanks are added whenever the mission or theater requirement make it necessary. The official combat radius of the P-63 is 50 per cent greater than the P-39.

**THE KINGCOBRA:** The P-63 Kingcobra, a heavier, more powerful version of the famous Bell P-39 Airacobra, soars over an airfield on a trial flight. The P-63 weighs 700 lb. more than the P-39 and has a 4 ft. increase in wing span.



### No Priority on "Jo" Blocks

• • • Critical priority demand for Johansson gage sets and accessories have now been met and gages are available without priority through the Ford Johansson division under a recent ruling announced by the WPB. Previously available only through an AA-1 priority, Johansson gages, manufactured by the Ford Motor Co., may now be distributed to the trade without restriction providing sales do not hamper future priority orders.



## Strong Postwar Trend Seen For Self-Propelled Farm Machines

By CHARLES T. POST

### Chicago

• • • Substitution of self-propelled farm machines for those drawn by tractors may mark a postwar trend in some types of equipment, certain sectors of the industry believe.

This comparatively new theory of motive power has been likened by those associated with it to the substitution in factories of machinery driven by individual motors for that driven by belts from centrally powered line shafting serving an entire group of machines. The exponents of self-propelled farm machinery claim the same advantages as did the sponsors of motor drives. Some of these are less power, fewer men, and greater efficiency and flexibility.

Prior to the war, most tractor manufacturers made a line of tools which could be mounted on the tractor itself, such as cultivators and corn pickers. In certain specialty crop areas, such as the Imperial Valley vegetable district in California, old automobiles were transformed in local welding shops into self-propelled mowing machines and bale loaders.

The makers of self-propelled equipment point out that it takes a full day to mount a corn picker on a tractor, and that it is impractical to remove the picker at any time during the picking season. This puts the tractor out of use for such jobs as fall plowing, bean harvesting or similar jobs for 30 to 90 days in the fall, when it is needed.

On the self-propelled machines a lighter and cheaper engine can be used to drive the implement, because it will work fewer hours per year and need only be large enough to furnish the power required by the machine of which it is a part. Internal combustion engines are cheap and good, and certain savings can be made in the design of tools by putting engines on them rather than making the tools attachable to the tractor.

To date, the self-propulsion principle has been applied chiefly to the combined harvester, or combine. Some years ago, self-propelled combines were built for operating in the rice fields, because they could cut close to the irrigation checks and ride over them, without losing any grain. The idea never gained real headway for general use, however, until four years

ago when the Massey-Harris Co. brought out a model designed to invade the large combine market. The general reasoning behind this move was that eight concerns were building combines of the 10-ft. cut or larger size to compete in a market where fewer than 6000 per year were sold, and that a self-propelled job might capture a larger portion of this field than a conventional machine.

It was also felt that the self-propelled model would provide more competition for the small so-called one-man combines which operate from tractor power take-off. These smaller machines, which have sold like hotcakes the past few seasons meet the qualifications of flexibility and saving labor, but wherever they require an auxiliary engine, like the larger conventional combines, the self-propelled machine is believed to be their match.

The technical advantages of the self-propelled machine are: 1. One man operation; 2. no tractor is used, saving manpower, fuel and repair part; 3. both grain and time are saved in the opening cut of a field, for the conventional combine rolls down and destroys its width in grain when it

makes its initial cut; 4. greater flexibility, allowing it to pass up green grain temporarily, and to operate over ridges and uneven ground.

Combines to date have been the principal application of the self-propelled idea, but Joe Tucker, former WPB official and vice-president of Massey-Harris Co., declares, "I believe there is a greater opportunity for labor saving on farms through designing self-propelled corn pickers, balers, swathers, forage harvesters, certainly cotton pickers, sugar cane machinery, beet harvesting machinery, mobile pea viners, and a good many other machines.

The objection to the self-propelled machines, insofar as the smaller farms are concerned, is that they tie up an engine for each single type of work to which they are applied, whereas the tractor with power take-off can handle a number of jobs. The self-propelled boosters answer that insofar as the combine field is concerned many of the smaller machines also require auxiliary engines, and that there is much to be desired from the standpoint of steady operation.

Massey-Harris has produced a few 7 and 8-ft. cut self-propelled machines to invade the smaller field. International Harvester Co. which entered the self-propelled field this year, produced only a 12-ft. machine for commercial sale.

**ROBOT LAUNCHING SITE:** *Yank technicians observe the mouth of the ski building of a German robot bomb launching site in France. This is one of a number of uncompleted bases left by Nazi workers in the wake of the Allied offensive.*



## Canada Starting to Doubt Its Growing Output Possibilities

### Toronto

••• Notwithstanding the fact that Canada has stepped up war production schedules well above the level of the latter part of 1943 and the first quarter of 1944, there seems to be growing doubt as to how long this high rate of production will be maintained. Output of artillery shells is commanding the greatest interest in the war program and there also has been a sharp gain in the production of explosives. On the other hand aircraft plants have sharply reduced operations on war account and it is now reported that some other lines of war equipment are being discontinued or curtailed. A number of war contractors appear to be getting the jitters and are wondering just how long their war business will be continued. It was announced locally this week that 800 employees of Research Enterprises, Ltd., makers of radios, electrical equipment, etc., will receive notice of lay-off within the next few days because the Chinese Government has cancelled a large war order. It was stated that the Chinese Government was forced to cancel the order because of inability to pay for the war material.

Prospects for resumption of civilian manufacturing activities are becoming brighter, despite the fact that Government officials still claim a seri-

ous shortage of workers to man war plants. So far, however, only small allotments of steel have been made for the production of consumer goods and these largely have been confined to the agricultural implement industry which is said to have placed big tonnage orders for delivery over the next few months. This business includes plates, sheets, bars, nuts, bolts, screws and a wide variety of other materials. It also is stated that both the Canadian National and Canadian Pacific Railways soon will be in the market with large rolling stock contracts.

Officials of the Canadian Locomotive Co., Ltd., Kingston, state that after completing six engines in July the company plans to deliver on August 15 the first of an order of 45 locomotives of the Pacific type to the Canadian Pacific Railway; three more will be delivered before the end of this month and five in each succeed-

ing month until the contract is completed early in May next year. It is reported that the balance of this year will keep the company's Kingston plant fully engaged in the building of nearly 100 locomotives for the Government of India, which is a new order duplicating the engine deliveries earlier this year.

The steel situation in Canada continues tight, and steel mill representatives state that bookings on bars and plate are sufficient to absorb all output to the end of this year while on sheets some producers now are accepting orders for delivery in the early part of first quarter 1945 but have no surplus capacity remaining this year. Steel producers as a whole are not concerned with the possibilities of war contract cancellations for steel. They state that in the event of the end of the war and any possible reduction of steel demand on this account, that peacetime requirements for the production of consumer goods will pour in in sufficient volume to keep mills at capacity operation for a long time into the future.

## WPB Eases Restrictions On Equipment

### Washington

••• WPB has eased restrictions on the manufacture of 10 kinds of construction equipment by amending 10 schedules of Order L-217. Under the amended order, effective Aug. 11, manufacturers are permitted to pro-

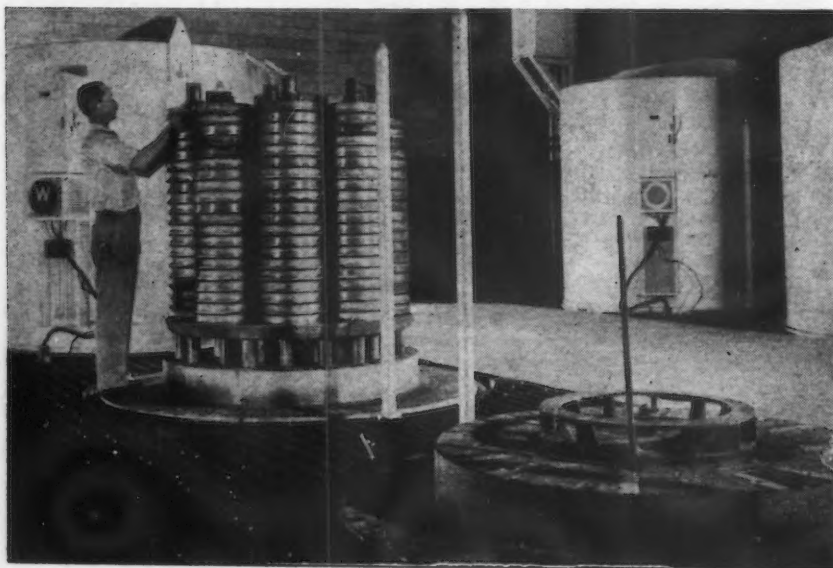
duce the types of the 10 kinds of equipment specified in the schedules, even though they were not producing these types before the dates established in the schedules when originally issued.

The types of equipment which may now be produced without regard to the dates in the original order are portable jaw and roll crushers, portable construction concrete mixers, truck mixer-agitators, pumps, tank car heaters and pumping boosters or circulators, bituminous paving finishers, bituminous heating kettles, bituminous materials maintenance units, bituminous patch plants, and asphalt surface heaters.

Manufacturers of this equipment are still limited to the specifications of the schedules and to the provisions of Order L-192.

Specification changes were made in only two of the schedules. Schedules VII, on pumps, removes the prohibition on the manufacture of hand cranks (other than rope starters) furnished as equipment for new single cylinder engine pumps. Schedule XII, on bituminous heating kettles, now permits the manufacture of two models, instead of one, in each of the five sizes of kettles.

**NITRIDING FURNACE:** Shown here is the base of a nitriding furnace, loaded with a charge of internal gears, with bell cover hood at the rear. The furnace was made recently at the Ohio plant of Wright Aeronautical Corp. They are used for nitriding aircraft engine cylinders and internal gears.





## Slackened Demand for Pig Iron Indicated by Blast Furnace Banking

### Pittsburgh

• • • Continuing to reflect the slackened demand for merchant pig iron was the announcement of the banking of another blast furnace at the Carnegie-Illinois Steel Corp.'s Edgar Thomson works. This brings the total number of blast furnaces down at Carnegie plants to five: Three at Edgar Thomson, one at Duquesne, and one at Mingo. While repairs will be made to some of these furnaces while they are out of operation, it was stated by the company that three of them were taken out of blast because of the slackened demand for pig iron.

Foundry consumption of iron has without question fallen off during the past two months. In addition to the normal summer slackening up of foundry operation, the critical manpower shortage that exists in this industry has further curtailed production of these plants. Evidence of this fact is the extraordinary emphasis that is being placed on foundry manpower recruitments by the War Production Board, the War Manpower Commission, and other government agencies.

Further slackening off of iron consumption by merchant buyers is the result of consumer's refusing to carry heavy inventories of this raw material. The situation is similar to that of the steel industry and its scrap stocks. Heavy stocks are being worked off and buying is being done on a curtailed scale so as to keep such inventories at or near the working level. It is the contention of consumers of both pig and scrap that a sudden end of the war in Europe shall not catch them with heavy stocks of these commodities bought at current ceiling prices.

There has not been and there is not expected to be any softening of pig iron prices, but such has not been the case with scrap. One of the districts' largest scrap consumers refuses to pay the springboard differential on heavy grades of open hearth scrap and movement of alloy and lighter scrap is very slow.

There is no serious consideration of a letdown in iron ore delivery, according to the chairman of the WPB Iron Ore Industry Committee, in spite of reports to the contrary. However, no official ore quota has been set by WPB directive as was established last year. Currently, it is estimated that ore

shipments for the season will be between 83,000,000 and 84,000,000 gross tons. Total shipments last season were 86,585,241 tons.

Ore requirements were estimated less this year since steel production proved last year that such a high total was not necessary and ore consumption was not as great as antici-

pated. While ore production and shipments are on an annual basis, if steel production should drop further for any period of time, ore storage facilities at furnaces and docks would be overtaxed. This might result in curtailment of shipments. The big factor in this case is the end of the European war, because there can be no break in steel demand until that time and production will not be depressed by manpower shortages to the point that ore shipments would be affected.

### July Ingot Production At 7,474,297 Net Tons

#### Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

Based on Reports by Companies which made 98.3 Per Cent of the Open Hearth, 100 Per Cent of the Bessemer, and 87.9 Per Cent of the Electric Ingot and Steel for Castings Production. Source: American Iron and Steel Institute.

1944								Calculated* weekly Number production of all weeks companies in (Net tons) month	
PERIOD	ESTIMATED PRODUCTION—ALL COMPANIES								
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		
	Net* tons	Percent* of capacity	Net* tons	Percent* of capacity	Net* tons	Percent* of capacity	Net* tons	Percent* of capacity	
January.....	6,769,438	97.2	439,551	85.4	377,751	83.3	7,586,740	95.6	1,712,582 4.43
February.....	6,410,338	98.5	409,781	85.2	368,555	87.0	7,188,674	96.9	1,736,395 4.14
March.....	6,976,450	100.1	455,368	88.5	388,408	85.7	7,820,226	98.5	1,765,283 4.43
1st Quarter.....	20,156,226	98.6	1,304,700	86.4	1,134,714	85.3	22,595,640	97.0	1,738,126 13.00
April.....	6,768,895	100.3	437,517	87.8	362,118	82.5	7,568,530	98.5	1,764,226 4.29
May.....	6,860,532	98.5	438,980	85.3	380,960	84.0	7,680,472	96.8	1,733,741 4.43
June.....	6,452,087	95.6	418,117	83.9	347,028	79.0	7,217,232	93.9	1,682,338 4.29
2nd Quarter.....	20,081,514	98.1	1,294,614	85.6	1,090,106	81.9	22,466,234	96.4	1,726,844 13.01
1st 6 months.....	40,237,740	98.4	2,599,314	86.0	2,224,820	83.6	45,061,874	96.7	1,732,483 26.01
July.....	6,723,994	96.7	415,593	80.9	334,710	74.0	7,474,297	94.4	1,691,017 4.42

Note—The percentages of capacity operated are calculated on weekly capacities of 1,572,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944 as follows: Open hearth 82,223,610 net tons, Bessemer 6,074,000 net tons, Electric 5,350,880 net tons.

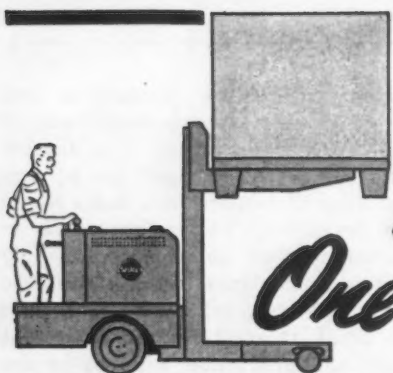
\* Revised January through March, 1944.

1943

PERIOD	ESTIMATED PRODUCTION—ALL COMPANIES								Calculated* weekly production of all weeks in companies in (Net tons) month	
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net* tons	Percent* of capacity	Net* tons	Percent* of capacity	Net* tons	Percent* of capacity	Net* tons	Percent* of capacity		
January.....	6,576,788	97.8	478,161	85.9	369,573	95.5	7,424,522	96.8	1,675,964	4.43
February.....	6,031,605	99.3	447,810	89.1	345,189	98.8	6,824,604	99.5	1,706,151	4.00
March.....	6,787,902	100.9	503,565	90.4	383,111	99.0	7,674,578	100.0	1,732,410	4.43
1st Quarter.....	19,396,295	99.3	1,429,536	88.4	1,097,873	97.7	21,923,704	98.4	1,704,798	12.86
April.....	6,510,824	99.9	482,478	89.5	380,401	101.5	7,373,703	99.3	1,718,812	4.29
May.....	6,669,703	99.1	482,424	86.6	397,564	102.7	7,549,691	98.4	1,704,219	4.43
June.....	6,202,889	95.2	453,663	84.1	382,801	102.1	7,039,353	94.8	1,640,875	4.29
2nd Quarter.....	19,383,416	98.1	1,418,565	86.8	1,160,766	102.1	21,962,747	97.5	1,688,144	13.01
1st 6 months.....	38,779,711	98.7	2,848,101	87.6	2,258,639	99.9	43,886,451	98.0	1,696,423	25.87
July.....	6,556,794	96.8	466,345	90.6	384,737	91.9	7,407,876	96.2	1,675,990	4.42
August.....	6,700,118	98.7	484,847	94.0	401,499	95.7	7,586,464	98.3	1,712,520	4.43
September.....	6,646,968	101.4	480,757	96.4	386,614	95.4	7,514,339	100.7	1,755,687	4.28
3rd Quarter.....	19,903,880	99.0	1,431,949	93.6	1,172,850	94.4	22,508,679	98.4	1,714,294	13.13
9 months.....	58,683,591	98.8	4,280,050	89.5	3,431,489	98.0	66,395,120	98.1	1,702,439	39.00
October.....	6,892,029	101.6	513,585	99.5	408,503	97.4	7,814,117	101.2	1,763,909	4.43
November.....	6,543,204	99.6	440,878	88.2	387,893	95.5	7,371,975	98.6	1,718,409	4.29
December.....	6,502,980	96.0	390,979	75.9	361,185	86.3	7,255,144	94.2	1,641,435	4.42
4th Quarter.....	19,938,213	99.1	1,345,442	87.9	1,157,581	93.1	22,441,236	98.0	1,707,357	13.14
2nd 6 months.....	39,842,093	99.0	2,777,391	90.8	2,330,431	93.7	44,949,915	98.2	1,711,074	26.27
Total.....	78,621,804	98.9	5,625,492	89.1	4,589,070	96.7	88,836,366	98.1	1,703,804	82.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons. Beginning July 1, 1943, the percentages of capacity operated are calculated on weekly capacities of 1,531,789 net tons open hearth, 116,494 net tons Bessemer and 94,667 net tons electric ingots and steel for castings, total 1,742,950 net tons; based on annual capacities as follows: Open hearth 79,867,450 net tons, Bessemer 6,074,000 net tons, Electric 4,935,960 net tons.

\* Revised January through December, 1943.



# Is your Problem One of Reducing

## DOWN-TIME OF MACHINES?

● Industrial Trucks have made a notable contribution to war production by reducing idle time of critical machines—keeping them operating at maximum capacity. Installation stories cited below are typical.

★ ★ ★



Down time of large presses at an aircraft plant are kept at a minimum through the use of Baker Die Handlers. Although dies are stored in the factory yard some distance away, little time is lost in bringing them into the plant and making changes. (Left)

A fleet of eight Baker Trucks keeps the plant of a large domestic range manufacturer—now engaged in turning out war goods—at top production. Hy-Lift Trucks service machines with materials to keep them running without interruption, bringing work to operators at working height. They also move machines, heavy machine parts and are a great help in general millwright work. (Right)



A busy drop forge plant keeps its presses going 24 hours a day with a fleet of 5 Baker Hy-Lift Trucks. Heavy forged parts are carried quickly from hammers to heat-treating, to finishing and to shipping. Trucks also serve hammers with dies weighing up to 2 tons, and make millwright work safer and faster. (Left)

Handling green foundry cores without breakage presents a difficult handling problem. A large tool manufacturer uses a Baker Crane Truck for setting delicate cores in its foundry, and Low-Lift Trucks for charging ovens with core racks. These trucks have been in service since 1928. (Right)



The Baker Low-Lift Truck at the left is carrying service tanks of cutting oils for machine tools. This mobile "filling station" has been a vital factor in keeping machines running at top speed in the plants of one of our leading aircraft manufacturers.

Because of their maneuverability, Baker Trucks spot loads exactly where they are handiest for machine operations—making it possible to get maximum production from expensive equipment, conserving man and machine time. (Right)



### WRITE FOR YOUR COPY

Plant and production managers, traffic managers, superintendents, purchasing agents and any others concerned with material handling will find the new Baker Catalog No. 52 a valuable reference.

### BAKER INDUSTRIAL TRUCK DIVISION of The Baker-Raulang Company

2175 WEST 25th STREET

CLEVELAND, OHIO

In Canada: Railway and Power Engineering Corporation, Ltd.

# Baker INDUSTRIAL TRUCKS

### NEWS OF INDUSTRY

### WPB More Liberal

(Continued from Page 109)

tresses, and dual sleeping equipment: bed springs: box, coil and flat, and metal crib springs; bedspreads, metal; cots, bunks and rollaways; mattresses: innerspring, sofa beds and studio couches. L-52. Bicycles and bicycle parts—all items. L-54-C. Office machinery—all items. L-65. Electrical appliances—dishwashers, domestic; electric appliances, commercial food preparation; hair clippers, electric; hand heaters, space, electric; heating pads, electric; repair and replacement parts: automotive, refrigeration, domestic and electric appliances.

L-65-A. Electric flat irons—all items. L-67. Lawn mowers—all items. L-63. Office supplies—pins, common and safety. L-73. Office supplies—pins, common and safety. L-74. Oil burners—all items. L-75. Coal stokers—stokers: class A, class B. L-89. Elevators and escalators—all items. L-91. Commercial laundry equipment, dry-cleaning equipment and tailors' pressing equipment—all items. L-98. Domestic sewing machines—all items. L-104. Metal hair pins and bob pins—all items. L-136. Church goods—all items. L-140A. Cutlery—all items. L-140B. Flatware and hollowware—flatware. L-151. Domestic watt-hour meters—all items. L-158. Automotive replacement parts—all functional items. L-176. Domestic and commercial electric fans—all items. L-180. Replacement storage batteries—all items. L-182. Commercial cooking and food and plate warming equipment—all items. L-185. Water heaters—all items. L-187. Cast iron boilers—all items. L-190. Scales, balances and weights—except coin-operated scales. L-199. Plumbing and heating tanks—boilers, range; tanks, hot water storage; tanks, water. L-201. Automotive tire chains, tractor tire chains and chain parts—all items.

L-222. Floor machines, rub-scrubbing machines, industrial vacuum cleaners and blowers for cleaning purposes—floor finishing and floor-maintenance machines, including floor sanding machines, portable rug-scrubbing machines; vacuum cleaners: commercial and industrial, including portable electric hand blowers. L-225. Electrical conduit, electric metallic tubing and raceways—electric conduit and fittings.

L-226. Printing and publishing machinery, parts and supplies—composing room and type-setting equipment; plate-making equipment; photo-engraving, lithographic, stereotype, electrotype, and rubber and plastic plate; printing press equipment; bindery and printers finishing equipment. L-248. Commercial dishwashers—all items. L-257. Farm machinery equipment—all items except tractors. L-270. Automotive maintenance equipment—automotive maintenance equipment for shops and garages; jacks; passenger car; tire gages; tire pumps, automotive; tire tools. L-275. Alarm clocks—all items. L-292. Food processing machinery—all items. L-308. Food dehydrators, domestic—all items. L-314. Lubrication equipment—all items. L-325. Motion picture 35-mm. projection equipment and accessories—all items. U-8. Manufacture of telephone equipment—all items. \*M-9-C. Animal traps and cages for commercial trapping and pest irons control; blow torches, gasoline flat irons, laundry tags, liquid fuel lamps and lanterns, marking devices, metal insect screen cloth, padlocks, pin tickets, rivets and burrs, watches, weather stripping, window shade rollers. \*M-11-B. Zinc—laundry tags, marking devices, padlocks, pin tickets, rain goods. \*M-38. Lead—rain goods. \*M-126. Steel—fireplace equipment, furnace scoops, hardware cloth, laundry tags, marking devices, padlocks, partition studs, pin tickets, playground equipment, rain goods, snow shovels, watches, water storage tanks for agricultural use, weather stripping, wheelbarrows, window shade rollers, steel wool.

\*Only products not restricted by L orders are listed here.





# ***BASIC REASONS***

## **WHY PERMITE CASTINGS ARE BETTER!**

### **1 Less Machining**

Advanced foundry technique and greater accuracy in production reduce need for machining to a minimum.

### **2 Accurate Dimensions**

Casting lay-out engineering, gage and checking fixture inspection and production precision, assure exact dimensions.

### **3 Uniform Quality**

Strict inspection schedules and thorough laboratory control, supported by X-ray inspection and spectographic analysis, guard Permitem's uniformly high quality.



American Industry is using PERMITE Aluminum and Magnesium Alloy Castings because they save time and money, afford three outstanding advantages.

PERMITE means rigid adherence to your specifications. Great strength, with no excess weight . . . freedom from porosity . . . better machinability . . . perfect uniformity . . . all of which are important to you.

Let us show what PERMITE can do in meeting your casting requirements — for current production or postwar designs.

**ALUMINUM INDUSTRIES, Inc.**  
Cincinnati 25, Ohio

**Detroit:**  
809 New Center Building

**Los Angeles:**  
324 North San Pedro Street

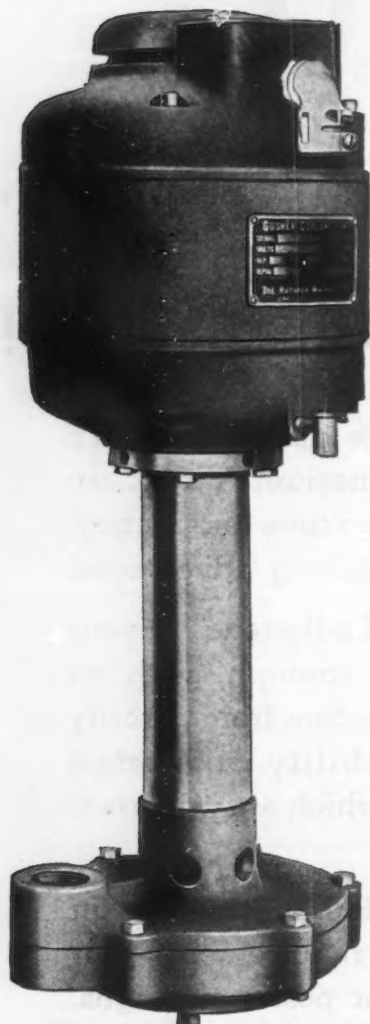
**Chicago:**  
616 South Michigan Avenue

**PERMITE ALUMINUM AND MAGNESIUM ALLOY CASTINGS**

# NO "time out" for SHUT DOWNS

## No Clogging—No Leaking

### GUSHER COOLANT PUMPS



#### Model TL-7320

See Section 2 of new catalog, indexed for quick reference.

Gusher Coolant Pumps mean 24-hour-a-day operation. Grit and chips in the coolant pass through a Gusher without the least harm. Having no packing nuts, no metal-to-metal contacts, no relief valves, the Gusher performs without auxiliary strainers. Available in many sizes and types—can be throttled from a mere dribble up to 200 g.p.m., giving a flow of coolant where you want it, when you want it and as much or as little as you want. The favorite Coolant Pump in leading plants throughout the country because of simple construction and long-time, hard-usage dependability. . . . There is a Gusher model and type for your special needs.

Write for catalog

Gusher Pumps—Patented and Patents Pending

## THE RUTHMAN MACHINERY CO.

1821 READING ROAD

CINCINNATI 2, OHIO

THE "GUSHER"—A MODERN PUMP FOR MODERN MACHINE TOOLS

## Only 30 Per Cent War Inventories Adaptable To Civilian Purposes

### Washington

• • • Inventories of munitions' manufacturers today are held to about \$10,000,000,000, because of the tight controls exercised by WPB. These inventories include raw materials, goods in process and finished goods.

It has been estimated by industry and reported to WPB that not more than 30 per cent of the inventories on hand at the end of the war will serve a civilian purpose.

As contracts are cancelled or cut-back, inventories that cannot be sold or taken over by the contractors toward settlement of their claims against the government, become surplus.

An example of surpluses left over from one contract termination being adapted by new war production is a tank program closed down in Detroit. Military strategy demanded a newer weapon, the manufacture of which required the skilled manpower employed on the tank program. When workers moved to the new plant making the desired weapons, SWPA said, \$4,000,000 worth of machine tools were moved also—being adapted with no delay to the new program.

Four-fifths of the inventories reported by war industries last fall were in raw materials and goods in process, and have been steadily, though slowly declining, according to WPB records.

Not only do surpluses develop as a result of contract cancellations, but changing requirements leave net "excesses" in the inventory of operating plants. These, however, are quickly detected through mandatory reporting of the use and inventories of critical materials to WPB.

War manufacturers have reported to WPB that their "excesses" of steel

• • • The following table shows the "excesses" reported for the last two quarters of 1943 and the first quarter of 1944.

Material	WPB Data—000 Omitted		
	First Quarter 1944	Fourth Quarter 1943	Third Quarter 1943
Carbon Steel	2757 N.T.	2620 N.T.	2439 N.T.
Alloy Steel...	380 N.T.	396 N.T.	413 N.T.
Total Steel	3137 N.T.	3016 N.T.	2852 N.T.
Copper and Copper Base	142,431 lb.	197,062 lb.	201,954 lb.
Aluminum...	152,718 lb.	176,379 lb.	187,634 lb.



# Capsules OF LIFE OR DEATH!

Valves—that's what these are—and their innocent appearance serves only to conceal their importance. For these valves are to modern warfare what the famous "horseshoe nail" (for the want of which the battle was lost!) stood for in the simpler fighting days of two hundred years ago. Designed for the control of oil, gas and other fluids, they are in active wartime service in aircraft of all types on every fighting front.

The four Weatherhead plants have long been fully engaged in making vital parts for the nation's

war machines at the rate of more than a million a day—and are prepared to make the same gigantic contribution to the peacetime needs of the nation!

Look Ahead with

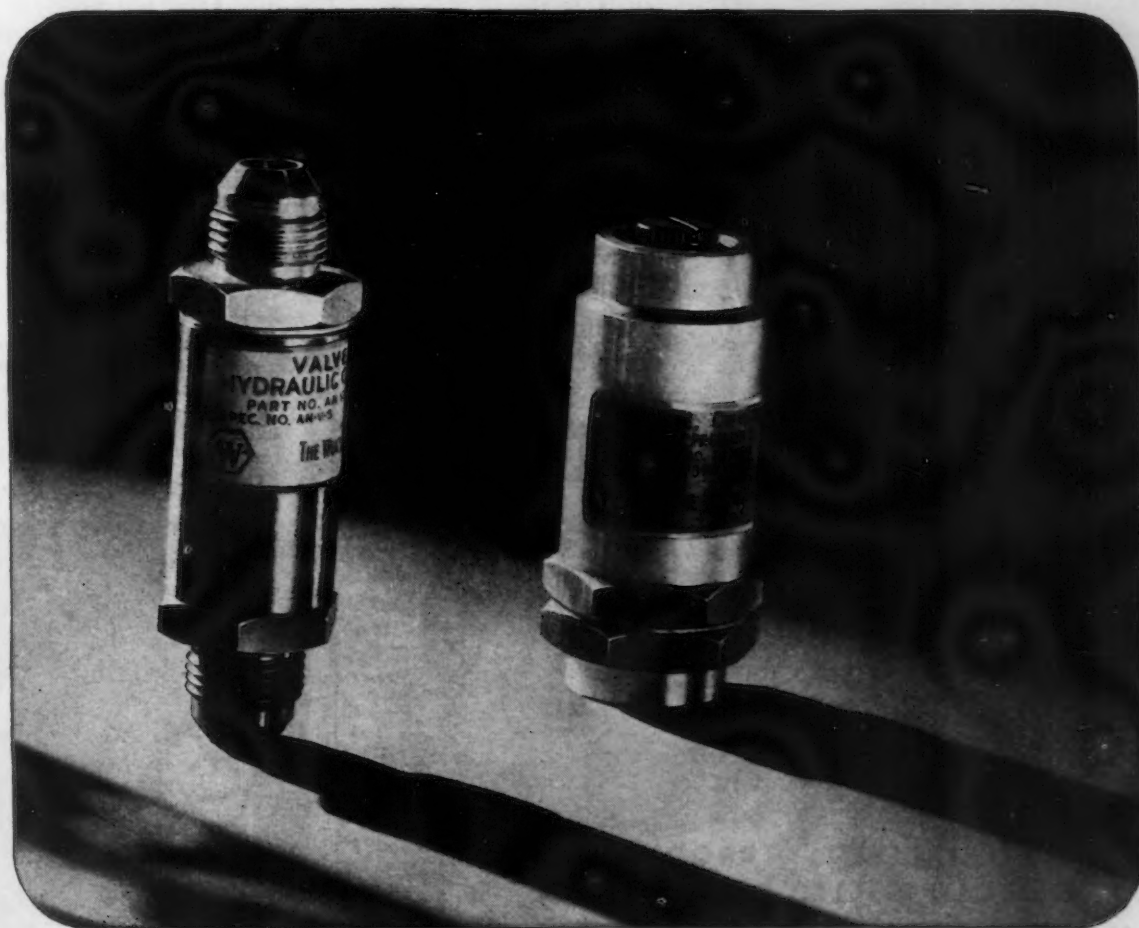


## Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND, OHIO

*Manufacturers of vital parts for the automotive, aviation, refrigeration and other key industries.*

Plants: Cleveland, Columbia City, Ind., Los Angeles  
Canada—St. Thomas, Ontario



**FREE:** Write on company letterhead for "Seeds of Industry"—a history of The Weatherhead Company, its many facilities and diversified products.

# ZINC COATED THOMASTRIP FOR DEEP DRAWING



● The part illustrated shows what can be accomplished with Thomastrip when it has been precoated with crackproof, peelproof, zinc finish. Used as a die lubricant and for rust resistance, it can also serve as an ultimate finish when buffed and lacquered. A test of this product may furnish the answer to your drawing and finishing problems.

Send for samples.

**Thomas Strip**  
COLD ROLLED  
STEEL



**SPECIALIZED PRODUCERS  
OF COLD ROLLED STRIP STEEL**

BRIGHT FINISH NOT COATED, SOLDER COATED, ELECTRO-COATED WITH  
NICKEL, ZINC, COPPER, BRASS, AND LACQUER COATED—IN COLORS

**THE THOMAS STEEL CO.  
WARREN, OHIO**

—not counting obsolete materials on hand—have been increasing for the past three quarters. Copper and copper base “excesses” and aluminum “excesses” have shown considerable reductions, however.

In the early months of the war program, paradoxes were discovered: excesses existed side by side with shortages. When manufacturers were unable to get copper valves, for instance, a questionnaire sent by WPB to 9000 possible owners of copper valves uncovered twice as many as were then needed.

The control of such excesses is vested in WPB and materials which are redistributed within operating plants are not under the jurisdiction of SWPA. They are “excesses” now—but will be classed as “surpluses” in case of contract terminations and their return to government ownership.

Sales of these “excesses”—made through WPB referral—total approximately \$7,000,000 weekly.

Sales of excess steel, according to WPB, have been at the rate of about 50,000 tons in a two-week period, and from April 1, to April 15, totaled 60,000 tons, selling at an average of \$60 per ton. Yet the pile on the books has remained constant at about 300,000 tons, and the “idle” carbon steel in plants today is reported to be in excess of 2,000,000 tons.

**IT'S THE BUNK!:** *A Yank rests in his newly acquired bunk, an empty wine cask, in an abandoned French barn. This guy has all the comforts of home including a pin-up girl in his own cask. About 5:45 a.m. this Yank will literally roll out the barrel.*





## SMITHway Electrodes in Action

This large, all-welded structure weighing 28,000 pounds is one of a number of stern frames for cargo ships being produced in the A.O. Smith plant for Walter Butler Ship Builders, Inc., at Duluth, Minnesota.

It is another example of the many applications of SMITHway welding technique that is speeding production in the war effort.



# The Proof Is in Production

**YOU** won't find welding electrodes *anywhere* that are put through the paces we give them in our own testing laboratories. That's because *thoroughness* is fundamental with us.

And that's fine as far as it goes. But our *real* test is our *shop* test—where over 320,000 electrodes a day go *into actual production* . . . into welded products we make right here in the A. O. Smith plant . . . into some of the largest and most complex structures ever welded.

*You bet* those electrodes have to be good—better

than good—as near perfect as production tools can be made.

That's why we make our own—why we offer the *same* electrodes to you!

The final proof of SMITHway Certified Electrodes is indeed *in production*! They are shop-tested and proved long before you get them. That's why they are *right*—why they are uniform in quality and characteristics—why they are able to deliver more good welds per man hour at the *least* possible cost.

Mild Steel . . . High Tensile . . . and Stainless Steel

**WELDING ELECTRODES**

made by welders . . . for welders

*Have You Bought That  
Extra War Bond This Month?*

SMITHway A. C. Welding Machine saves power; eliminates arc blow.

SMITHway Welding Monitor trains better welders faster.

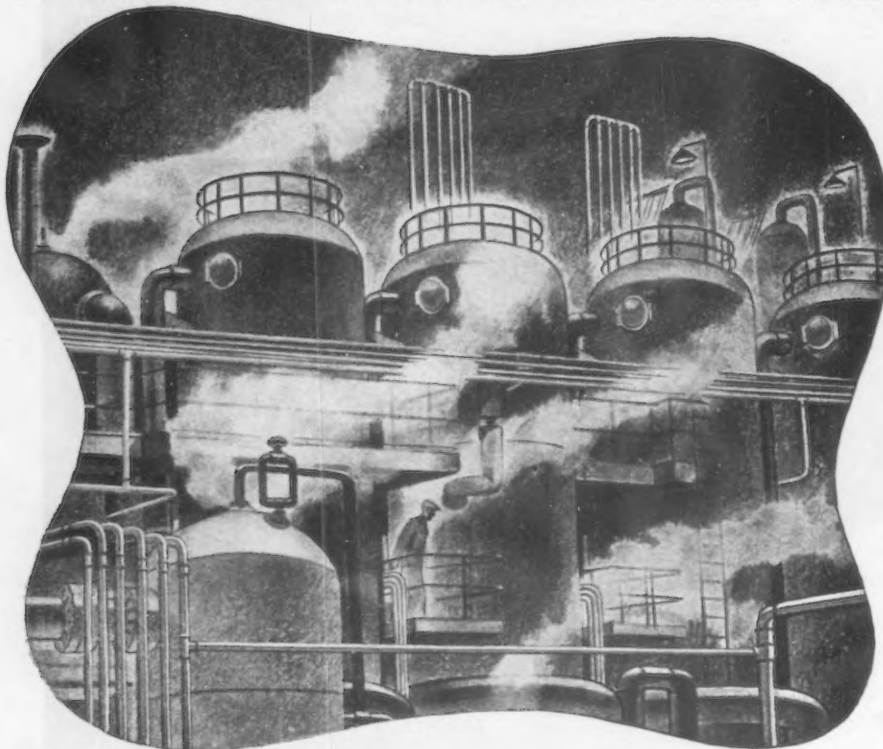


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# Fluid Power

## MAKES MOLECULES BOUNCE!

In synthetic rubber plants, Fluid Power helps pry the molecules apart and squeeze them into new combinations. Liquids and gases are measured, mixed and transformed to meet the exacting standards of chemical formulas.

Fluid Power is transmitted through tubes. It helps to drive, control, and regulate . . . all the way through from the raw ingredients to the bouncing tire.

Fluid Power is simple, dependable. And that's an essential in the complex operations of rubber and chemical plants and modern oil refineries. Whether the job calls for precision timing or powerful, remote control, Fluid Power does it efficiently—and without coddling!

Where and how can Fluid Power be put to work for you? The applications are limitless. A Parker engineer will be glad to discuss your problem with you.

### AT YOUR SERVICE . . .

#### FLUID POWER ENGINEERING

Solving power and control problems . . . engineering new Fluid Power systems is the day-to-day job of Parker engineers. In the marine, railroad, petroleum, Diesel, refrigerator and machine tool and other industries, they are developing new and interesting applications which you should know about. Ask a Parker engineer, or write direct to The Parker Appliance Company, 17325 Euclid Avenue, Cleveland 12, Ohio.

# PARKER

APPLIANCE COMPANY

CLEVELAND • LOS ANGELES

FLUID POWER ENGINEERING

## Altoona Establishes New Phase to Service Readjustment Plans

Altoona, Pa.

• • • Altoona has added a brand new phase to readjustment plans for returning servicemen and women.

Veterans will get free counsel and guidance from businessmen and women beginning the day they come home and continuing until they are happily established in communities of Blair County.

The guidance will be provided by the Veterans' Counseling Committee, 50 of the county's leading business and professional men and women working in cooperation with the Altoona Chamber of Commerce, according to Miles F. Hollister, chairman.

Convinced that returning veterans are entitled to more than "bread and meat" jobs, the committee will give counsel and guidance to returning servicemen in an effort to place them where they can make the best use of their natural talents—in jobs that will yield them happiness with the passing of the years.

Members of the committee represent a cross section of the most widely experienced business and professional men and women in the community. Doctors, lawyers, school officials and men and women who have been successful in large and small businesses of all types stand ready to advise returning veterans. The idea is to have at least one trained counselor with years of practical experience in any field of work in which a serviceman may be interested.

The members of the counseling committee have been specially trained for this work. They were given an intensive course on vocational guidance by the Department of Psychology of the Pennsylvania State College. Hollister explained that the plan is unique in that it combines professional and business experience with special training for the task of helping veterans find themselves.

Mr. Hollister believes that some such type of counseling is vitally needed in every community. "Many boys who left school to enter the service will be dumped back into civilian life to make the most important decisions of their lives—and make them right away. Among these decisions will be the selection of a life's vocation. Obviously, with 18-year-old civilian experience, they will need help.



# Ready-



**JUST OFF THE PRESS! —** Here is your free copy of a booklet containing important practical heat-treating information about Stainless Steels. Send for it today!

Prepared by Rustless to help users and prospective users attain full advantage of the corrosion-resisting and mechanical properties of Stainless Steel, this booklet contains important data not previously published. Hardening, surface hardening, stress-relieving, tempering and annealing are treated in simple, understandable language. A whole chapter is devoted to solving heat-treating problems. Also included is useful information pertaining to equipment, furnace atmospheres, scale removal, passivation and hardness testing.

For shop convenience, envelopes in the back of the booklet contain removable **HEAT-TREATING DATA SHEETS** of concise instructions for heat-treatment of each standard grade of Stainless Steels.

Send for your copy of this free booklet. A request on your company's letterhead will bring it promptly.



## RUSTLESS

*Producing STAINLESS STEEL Exclusively*

**RUSTLESS IRON AND STEEL CORPORATION**



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THE IRON AGE, August 17, 1944—127

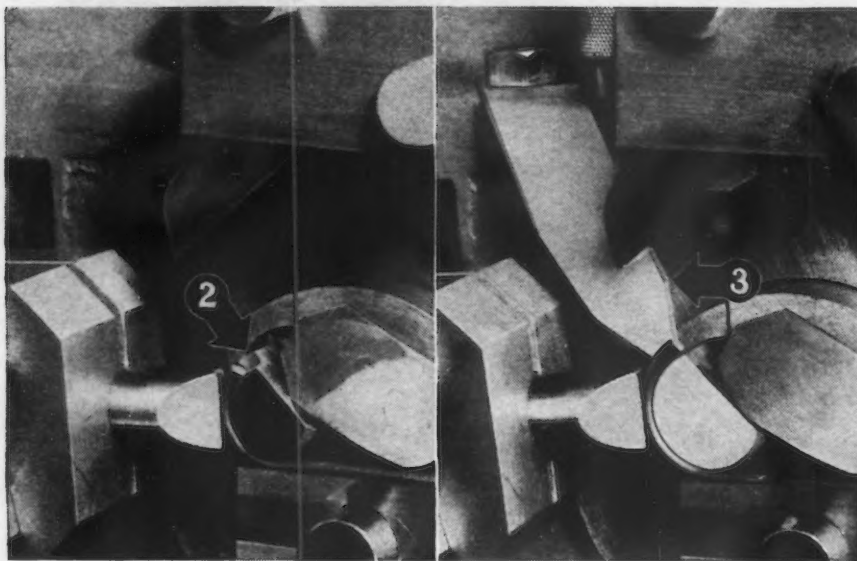


## TORRINGTON

Force Feed Mechanical  
LUBRICATOR

Positive, never-failing force-feed bearing lubrication. Design flexibility also enables power takeoff from machine to front, rear, side or bottom by ratchet or rotary means. For complete information write, stating number of feeds and drive desired.

**THE TORRINGTON**  
MANUFACTURING CO., TORRINGTON, CONN.



## HELPS TO GREATER ACCURACY *in Spring Coiling*

### No. 6 End Squaring Compression Springs

The versatility of Torrington Spring Coilers is constantly being explored—with most satisfactory results—by those who submit their spring coiling problems to our engineers. Two solutions of a common problem are detailed here:

- 1 A secondary pitch means is of great assistance in squaring ends of highly stressed compression springs. It is a definite means of preventing the first coil from pointing inward. Without tooling similar to that suggested below, such springs will usually show a thin section on the outer coil.
- 2 True squaring is accomplished by controlling the wire during the initial half coil before it strikes the standard pitch tool. Putting a shoulder on the arbor, back of the wire, is the method illustrated at left.
- 3 An alternate method is attaching a secondary pitch tool to the coiler housing (as illustrated at right) which will contact the wire at the same point as the arbor shoulder.
- 4 Specifications for secondary pitch means will vary with spring characteristics, but they are easily provided. Spring manufacturers are invited to write us for assistance in developing the correct tooling on this or any other spring coiling problem.



September 21st—Reducing Ends

**THE TORRINGTON**  
MANUFACTURING COMPANY  
TORRINGTON, CONNECTICUT

## Largest Wind Tunnel To Assist Nation In Aeronautical Secrets

### Pittsburgh

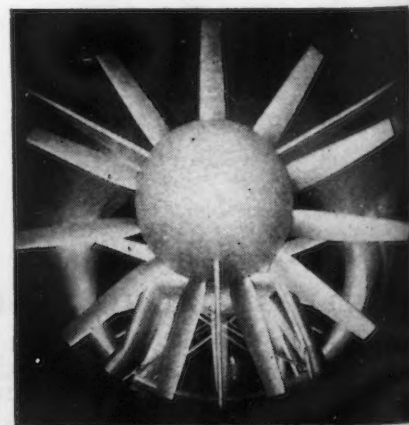
• • • NACA officials have announced that the important altitude wind tunnel has been placed in operation at the NACA Aircraft Engine Research Laboratory in Cleveland. Disclosure of the completion of the tunnel, first of its kind in the world, marks the addition of a valuable unit to the nation's aeronautical research facilities. The tunnel has been rushed to completion for secret investigations of new military power plants, including jet propulsion systems.

Following the basic design laid down by the NACA, the Pittsburgh-Des Moines Steel Co., Pittsburgh, provided the detail, designed, constructed the tunnel, and placed it in complete operating condition at a cost of \$5,000,000. By contributing essential improvements to combat airplanes, it is proving to be an invaluable asset to the shortening of the war and will in a like manner be invaluable to our aviation future.

The NACA altitude wind tunnel is unique from several standpoints. It is the first of its kind for investigating under altitude conditions aircraft power plants as installed in airplanes. It is the most complete equipment as yet developed for getting the "bugs" out of entire power plants designed for high altitude operation before the airplane goes into production.

The test section of the tunnel has a diameter of 20 ft., sufficient for testing engines of 3000 hp. or more. The tunnel is designed to simulate subzero

**GALE BLOWER:** These two sets of fans force air through the test section of a wind tunnel at the rate of more than 600 mph. at the Ames Aeronautical Laboratory, Moffett Field, Cal. The fans are powered by two 13,500 hp. motors.





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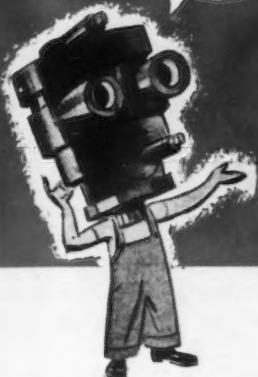
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PRESSURIZED POWER  
AND CONTROLLED FLOW

BY *Pesco*

WE WROTE  
THIS BOOK  
FOR YOU



★ There are plenty of new and exciting developments these days in precision pumps . . . in hydraulics and controlled liquid flow. Demands by modern aircraft for performance beyond the ordinary have led to many important improvements.

Out at PESCO we've been so busy developing and building all types of improved pumping equipment for these planes that there's been little time left to

tell you all we'd like about how this new equipment can serve you.

But we've done the next best thing by preparing a book, which tells all we can right now, of many new developments that you should know about.

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Book entitled "Pressurized Power  
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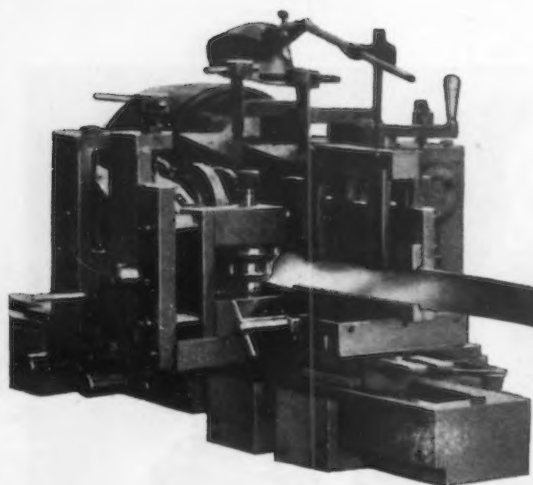
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In Precision Hydraulics, Fuel Pumps,  
Air Pumps, Related Accessories . . .

PERFORMANCE POINTS TO *Pesco* FIRST



## Your Forming Rolls tell the Story!

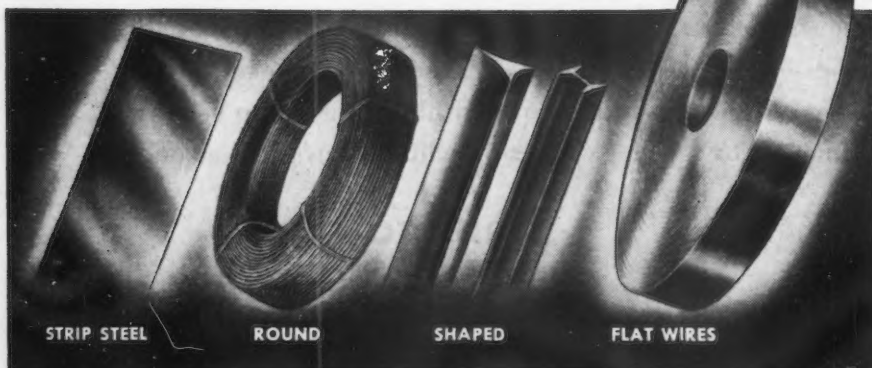
ROEBLING FLAT WIRE pays off when it is formed, punched, sheared or drawn... pays off in the form of faster production, fewer rejects. It's the effect of holding dimensions to strict tolerances, of seeing that steel analysis is right, temper and uniformity closely controlled.

And flat wire is just one of a family of Roebling Wire Products that gets this custom-tailored treatment. With steel-making facilities, trained manpower and special production tools, we are ready to deliver either round, shaped, flat wires or strip steel that will help your fabricating machines do a better job.

JOHN A. ROEBLING'S SONS COMPANY

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STRIP STEEL

ROUND

SHAPED

FLAT WIRES



# ROEBLING

PACEMAKER IN WIRE PRODUCTS

ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • AERIAL WIRE ROPE SYSTEMS • COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • FITTINGS • WIRE CLOTH AND NETTING • WIRE ROPE AND STRAND AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • SUSPENSION BRIDGES AND CABLES

temperatures encountered at 30,000 ft., and is strong enough to simulate pressures encountered at 50,000 ft.

The refrigerating plant provided to produce altitude temperatures in the tunnel test section has a refrigerating capacity which, if utilized for ice making, would manufacture 10,000 tons of ice each 24 hr. Cooling water at the rate of 20,000 gal. per min. is required to transfer the heat removed.

The tunnel is of steel construction using an alloy especially adapted to temperature changes and is supported through steel rollers on concrete piers in such a manner as to provide for movement in any direction to permit expansion and contraction of the steel shell. Heat losses are minimized by an insulating layer of glass wool which is in turn covered by a steel cover. An 18,000 hp. electrical motor drives the 31-ft. diameter, 12-bladed propeller on an extension shaft from outside the tunnel shell.

Both tunnel and engine under test are controlled from an adjoining sound-proof control room, where the operator governs the pressure, temperature, air speed within the tunnel, angle of attack of the model and operation of the engine and propeller. Instruments indicate the forces on the model as well as complete performance data.

Chief purpose of the tunnel is to save time in clearing for production new types of airplanes designed to operate at the highest attainable altitudes. The tunnel can be used to study performance at speeds and altitudes in excess of those attainable in test flight, and in addition permits control of air conditions manually—any desired temperature and pressure combination may be obtained. The information gained from this tunnel will materially aid the war effort, according to NACA.

## Jones & Laughlin Second Quarter Earnings Increase

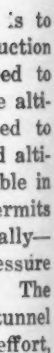
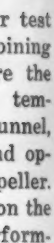
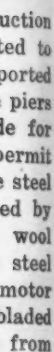
Pittsburgh

• • • Jones & Laughlin Steel Corp., reported for the second quarter of the current year a consolidated net income of \$1,879,835 after all charges, including depreciation, interest, depletion, and taxes. This compares with a net income of \$2,411,248 for the corresponding period of 1943, and \$1,708,352 earned during the initial quarter of this year.

Consolidated net income for the year to date was \$3,588,187, compared with that of \$4,810,617 reported for the same period of 1943. These are subject to the Renegotiation Act.



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*The*  
METAL SPECIALTY Co.

**SALES OFFICE**  
West Grand Blvd.  
Detroit, Mich.

## Tool Engineers Will Discuss Strategic Data At Syracuse Meeting

### Syracuse

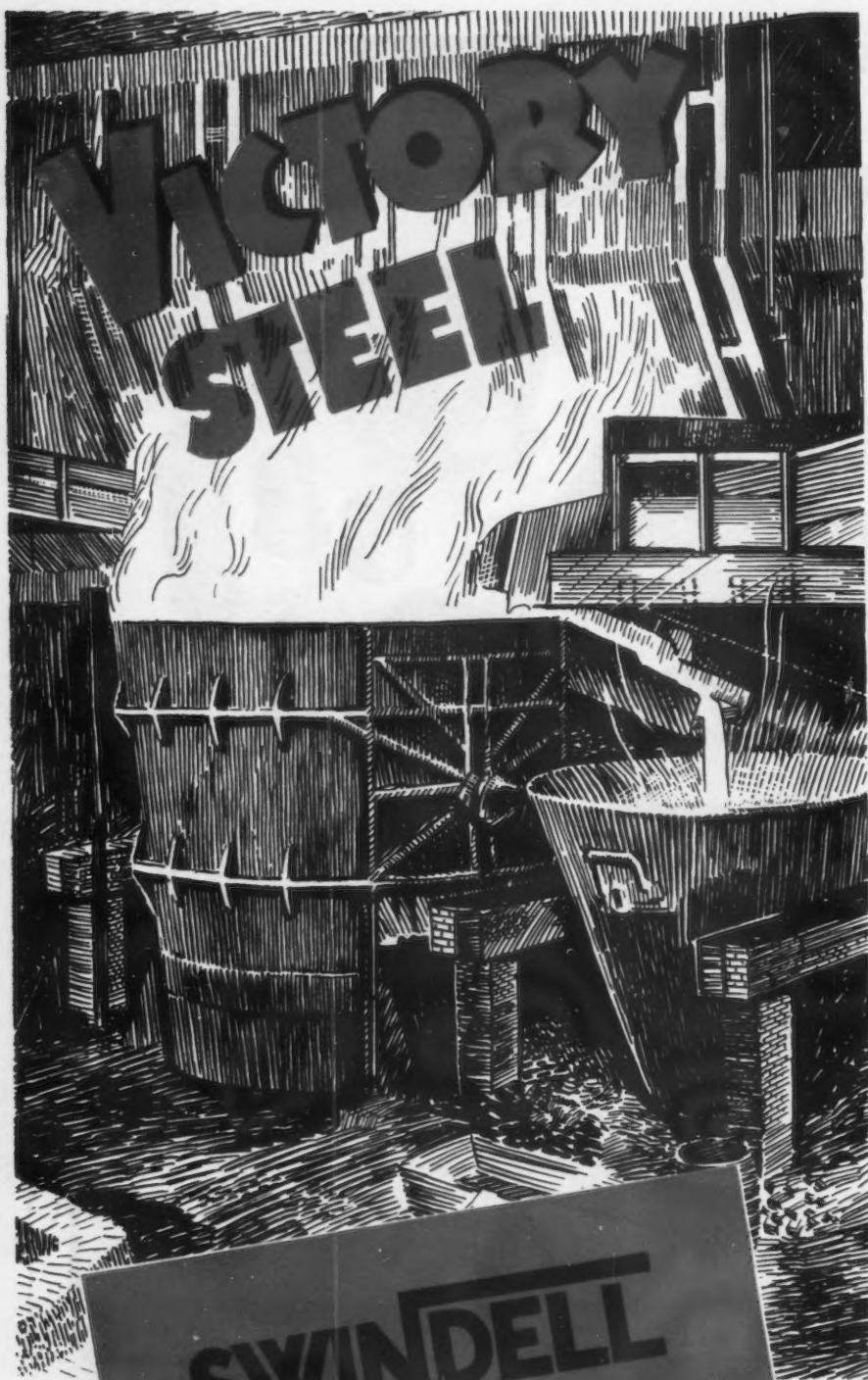
• • • The American Society of Tool Engineers will hold its twelfth semi-annual meeting here, Oct. 12-13-14, 1944, with Hotel Syracuse as headquarters.

The vital need of extending up-to-the-minute information concerning methods of producing more and better war materiel and developing more and better equipment of production capable of being operated efficiently by women and unskilled operators has caused the Society's National Executive Committee to decide that this meeting is not one of those falling within the scope of the request of the Office of Defense Transportation that "unessential" conventions be cancelled.

National President D. D. Burnside, of St. Louis, points out that "failure to hold the semi-annual meeting this year would break the continuity of the effective meetings held by the society, particularly during the war period, when much valuable information has been presented at the technical sessions and carried to every part of the United States and Canada by word of mouth, as well as through the effective presentation of these subjects in the pages of the excellent technical journals of the North American continent."

Mr. Burnside indicated, however, that, in the interests of eliminating unnecessary travel, there will be no urge to build a large attendance at the Syracuse meeting. It is expected, he said, that each of the 65 Chapters will be represented by at least two members qualified to return to their respective Chapters and report on new developments, so that tool engineers everywhere will be able to attain their goal of "producing the most of the best, the quickest, for the least cost."

Past-President Ray H. Morris, of Hartford, who is in charge of the program, announces that already arrangements have been completed for a discussion of "Magnesium Alloys," by representatives of Dow Chemical Co. and others in the field of machining this metal and its alloys. "Operating a Branch Plant in Canada" will be presented by a group from the Dominion. "Tool Engineering Education" and other technical talks by outstanding representatives of industry are being scheduled.



## SWINDELL OPEN HEARTH FURNACES

MEET TODAY'S EXACTING  
DEMANDS IN A HURRY!

CAPACITIES FROM 5 TO 200 TONS

SWINDELL-DRESSLER Corporation

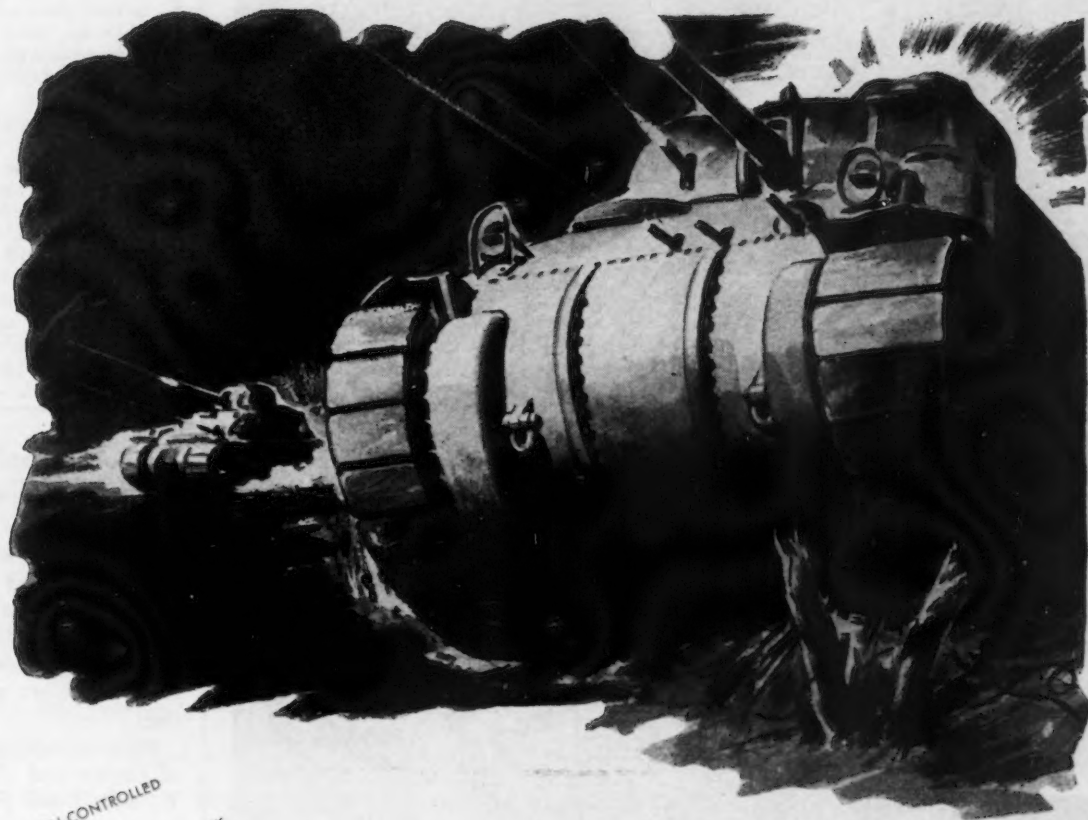
Designers and Builders of Modern Industrial Furnaces  
PITTSBURGH, PENNSYLVANIA

INSTALLATIONS  
WHEREVER  
STEEL  
IS MADE



# **TANK-TOUGH!**

## **ARISTOLOY NITRALLOY**



ARISTOLOY PRECISION-CONTROLLED  
ELECTRIC FURNACE STEELS HIT THE MARK

Nitrided Aristoloy Nitralloy tank parts, operating against each other without lubrication in sand, moist atmosphere and heat, are doing a good job in tough spots. Aristoloy Nitralloy can put these tank-tough qualities to work in your equipment.

If you design your vital parts for maximum life use Nitrided Aristoloy Nitralloy. Its sapphire hardness and freedom from internal stress are combined with a minimum of distortion during nitriding.

**COPPERWELD STEEL COMPANY WARREN, OHIO**

CARBON TOOL STEELS  
ALLOY TOOL STEELS  
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AIRCRAFT QUALITY STEELS  
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PHOTO BY LANDESMAN-DRAPER MFG. CO.

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must move heavy unit loads through production, shipping

and storage; avoid rehandling; save time,

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STRAIGHT—GAS POWERED INDUSTRIAL TRUCKS EXCLUSIVELY—SINCE 1919

## Snowplows Available

Washington

• • • WPB has told the Snow Plow Manufacturers' Industry Advisory Committee that sufficient snowplows will be available to meet 1944-45 essential requirements. This has been made possible by Army cut-backs and decreased Army-Navy demands, together with the fact that demand from civilian governmental bodies for 1944-45 is not as high as had been expected.

WPB officials said that carbon steel will be in shorter supply for the fourth quarter because of increased military requirements and that it may be necessary to make some reduction in allotments.

## Ceylon Graphite Stocks Must Be Adjusted Says WPB

Washington

• • • The WPB has informed the newly-organized Graphite Industry Advisory Committee that stockpiled quantities of Ceylon graphite must be adjusted wherever possible before any further import purchases are considered.

Since restrictions exist on imports of Ceylon and Madagascar graphites, WPB will ask plants in the graphite industry to specify which of 26 particular grades and what quantities they will require for 1945 deliveries. These particular grades are not considered sufficiently essential by the government to justify stocking through regular purchases. Use of domestic dusts is encouraged because some Ceylon graphites now available are higher priced.

## GM Produces First 18-Cylinder Aircraft Engine

Detroit

• • • Chevrolet Div. of General Motors Corp. has produced its first 18-cylinder Pratt & Whitney aircraft engine. M. E. Coyle, Chevrolet general manager, said that the new type engine, the R2800-C, was test run five months and 18 days after work on it was begun. Chevrolet, he said, has built more than 46,000 14-cylinder Pratt & Whitney engines in the past two years.

The new engine will power fighter and bomber planes, including the P-61 nightfighter and the P-47 Thunderbolt. The 18-cylinder engine program is superimposed on the company's continued output of 14-cylinder models.





## WHAT DO *You* PAY FOR IN CARBIDE TOOLS?

Carbide tipped cutting tools have done such a phenomenal job in increasing production, cutting costs and improving quality that it is easy to overlook some fundamentals when we talk about carbides.

For example, tool cost per piece with carbides depends even more on the know-how of tool design, grade selection, precision, manufacture, and application than it did with high speed steel tools.

To meet mass tooling requirements for war, everybody in the carbide industry—including ourselves—has been producing so-called "standard" tools. Even in peacetime, of course, there will be a place for such tools, but we also know that when COST PER PIECE is an important consideration, the lowest priced tool is not necessarily the best.

We at T.C.T. have been producing carbide cutting tools since they were first introduced in the United States. We know from experience that T.C. tipped tools, tailored for a specific job more than pay for their initial cost. It is well at this time not to lose sight of this fact, when most of us have become accustomed to ordering standards to obtain something in a hurry.

**TUNGSTEN CARBIDE TOOL**  
*Company*  
2661 Joy Road, Detroit 6, Michigan



*Don't  
guess*  
at  
Cutting  
Fluids



*A* cutting fluid is measured by its performance on a particular job. Yet it isn't necessary to try one oil after another until you hit the one which performs best. Engineering knowledge based upon experience can expedite your selection.

D. A. Stuart Oil Co. offer you the cooperation of skillful, trained engineers. Experience since 1865 has developed an insight into the fundamentals of cutting and grinding fluid application which is available to you with every drum of Stuart Oil.

There is a Stuart service engineer near you ready to help eliminate guessing at cutting fluids. Why not use him?

*Having difficulties in thread grinding, gear grinding, form grinding? Investigate Stuart's grinding oils, including Thred Kut 99 grinding oil, SuperKool 81X, and Excelene.*

*Our new booklet, "Grinding With Oil," tells the story. Write for a copy.*

**D. A. Stuart Oil co.**

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Warehouses in Principal Metal-Working Centers



## Australia Criticized For Commission Cuts On Lend Lease Orders

Melbourne

... Sharp criticism has been aroused by the recent action of the Australian Government in arbitrarily cutting the rate of commission on Lend Lease orders paid by American manufacturers to their regular, long established, authorized representatives in Australia, according to the *American Exporter*.

In the case of American hand standard, small and precision measuring tools the Australian Government has decided on a flat rate of only 1 per cent of factory cost as being the commission paid on Lend Lease orders to representatives in Australia, far below the normal rate.

American exporting manufacturers point out that Australia's arbitrary action is out of harmony with the attitude of other parts of the British Empire. For when Lend Lease was first inaugurated, most parts of the Empire, especially Great Britain itself, appeared to be fully cognizant of the necessity and justice of maintaining the legitimate position of the importing distributors or representatives of American goods. In view of the fact that a Lend Lease order is actually placed by the United States government and represents an expenditure of money of the American taxpayer, naturally the American government can scarcely be expected to pay a commission or a profit to a foreign representative or distributor for handling American goods supplied by the American taxpayer as part of the war effort.

Therefore, at the beginning, the British Government, particularly, undertook to pay a profit or commission to the regularly established representatives of American manufacturers.

In many cases bids made under Lend Lease by American manufacturers specified, "If this order is for shipment to the British Isles through Lend Lease, the price is to be such-and-such per cent less," it being understood that the percentage so deducted would be paid by the British Government to the representatives of the American manufacturer.

The article criticizing the Australian Government's action points out that the Australian Government in arbitrarily cutting the rate of com-



## The CONE AUTOMATIC MACHINE COMPANY



sees many

# GOOD THINGS AHEAD

**It is reported that . . . . .**

Vibrating chisels, similar to those used to break up pavements, are being tried out by dentists as an improvement over the familiar drill.

get ready with CONE for tomorrow

The rare metal, tantalum, unknown forty years ago, is being used in bolts, screws, and plates to repair the broken bones of wounded soldiers.

get ready with CONE for tomorrow

A gas-filled fuse, now used to detonate mines, will explode a charge three and one-half miles away in one second. It can be used under water and is itself a powerful explosive. Laid in a line cross-country, it will instantly clear a path through trees and brush or dig trenches.

get ready with CONE for tomorrow

A low priced ultraviolet lamp bulb is ready for the after-the-war market.

get ready with CONE for tomorrow

A noted aviation engineer and successful industrialist has plans for a revolutionary helicopter that uses a contra-rotating propeller, carries four passengers, and can be operated on a highway.

get ready with CONE for tomorrow

A new heat-resistant alloy is reported that uses silicon and manganese to replace part of the scarce nickel and chromium formerly used.

get ready with CONE for tomorrow

Fireproof cotton batting is now being made for upholstery and insulation.

get ready with CONE for tomorrow

A new iron is being made which has as much as five times the tensile strength of ordinary cast iron. With it, even cast iron springs can be made.

A plant has been built for processing large quantities of the lowly milkweed. The floss is a good substitute for kapok in upholstery, an oil for paint is made from the seeds; wallboard can be made from the stalks, and latex extracted from the leaves.

get ready with CONE for tomorrow

A new machine checks the size of ball bearings at rates as high as 20,000 per hour.

get ready with CONE for tomorrow

New sleeping cars have a triple deck arrangement of berths.

get ready with CONE for tomorrow

The "electric eye" can now be used to detect and warn of dangerous gases in the air.

First post-war models of television sight and sound receivers are expected to sell at from \$200 to \$700. Reception will about equal in quality the familiar 16 mm. motion pictures.

get ready with CONE for tomorrow

A new cream protects those of our Navy who are exposed to the risk of flash burns.

get ready with CONE for tomorrow

Coilsprings of Nylon, while not as strong as steel, will function indefinitely without breaking from "fatigue."

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A new rubber sheeting perforated with 6,400 holes to the square inch is being used for filters.

get ready with CONE for tomorrow

A new microscope converts an invisible ultra-violet image into a visible full color picture without the use of photography or fluorescent screens.

*You'll need production like this  
in the days AHEAD*



**THIS** speedometer pinion blank is made of cold rolled steel and has a hole 1" deep in one end. It is produced in 10 seconds on a 6. Spindle Conomatic.



# CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.



# GIANT OF LIFT TRUCKS for Top-Speed Handling of BIG jobs

It's Model 12-HT—and this ruggedly-built, tireless "giant" is fully capable of handling the toughest loading, unloading, transporting, piling and storing jobs — hour after hour — at top speed. Every day, Ross Industrial Lift Trucks are saving huge sums of time and money by eliminating back-breaking labor in warehouses, industrial plants, and terminals. If your heavy material handling is causing a bottleneck, let our engineers show you how Ross Lift Trucks can eliminate the problem — at a great saving. Write today for Bulletin DW-74.

The ROSS CARRIER COMPANY, Benton Harbor, Michigan  
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mission stated, "the Lend Lease remuneration has been fixed at such a percentage as will return the trade as a whole in one year, approximately twice the average annual commission earned during the years 1935 to 1939 and will represent adequate payment for the service rendered."

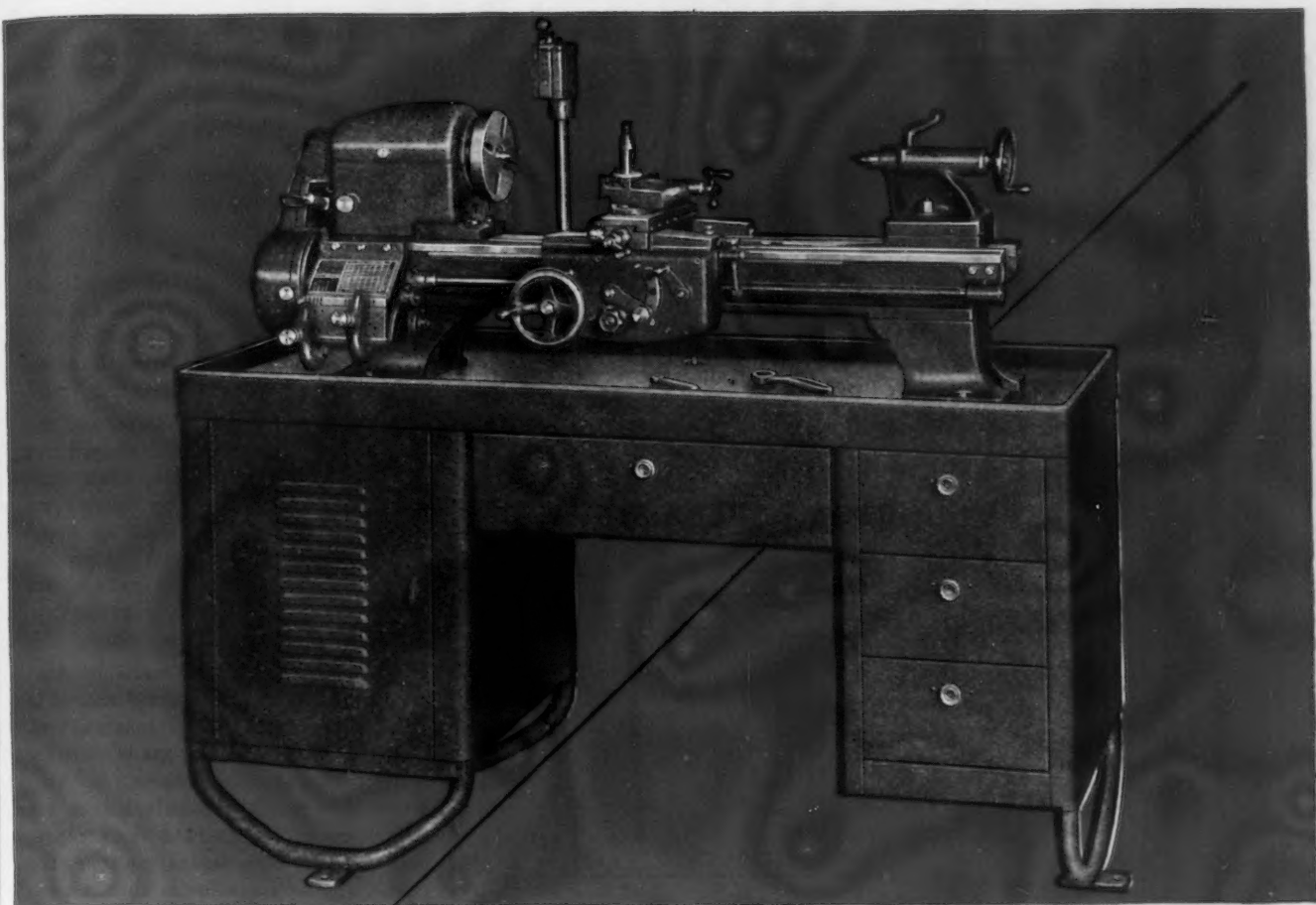
But, American manufacturers point out that there is a great discrepancy between the overall calculations made by the Australian Government regarding these commissions and the effect upon the individual representatives of American manufacturers.

For example, one American manufacturer who paid his representative in Australia 7½ per cent commission in peace times and sold an average of \$13,000 a year in that market, his representative thus receiving \$975 commissions, has averaged \$17,000 Lend Lease orders but his commercial sales have dropped to \$200 a year. Thus on the basis the Australian Government proposes, this representative would earn \$15 a year on commercial sales and \$170 a year on Lend Lease or a total of \$185. Instead of earning "approximately twice the average an-

**GUN CAMERA:** A Yank armament expert installs a gun camera in the wing of a P-47 Thunderbolt fighter at Wright Field, Dayton, Ohio. Gun cameras, alined with gunsights to record hits or misses, are standard equipment on all AAF fighters.





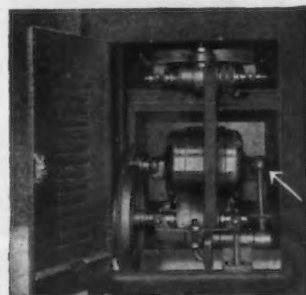


*Logan Presents*

## NEW QUICK CHANGE GEAR CABINET LATHE

*With Automatic Apron*

The Logan Cabinet Lathe is particularly adaptable to tool room work, for maintenance, for training, or for production. It is not only built with features and to standards of precision that are outstanding in its field, but it also has the durability to stand up under continuous production use. The carriage with friction-feed automatic apron travels over a rugged, warp-free bed that is ground to within .0005" of absolute accuracy. The total run-out of its headstock spindle 12 inches from the bearings is less than .001". The lead screw is held to within .002" in 12 inches. The spindle turns on a double row of preloaded, grease sealed ball bearings, and at 40 other vital points throughout the lathe friction is minimized by self lubricating bronze bearings. Four large drawers in the strong tubular steel cabinet may be used for tool storage. Each drawer has an individual lock. Left hand compartment contains underneath motor drive and countershaft. The entire cabinet stands on a 3-point base, assuring a steady installation on any floor. All moving belts and gears are completely enclosed. Ask your Logan dealer or write for catalog information.



**UNDERNEATH DRIVE:** Completely self contained and enclosed in left compartment of cabinet. For easy, safe belt changing, the lever (indicated by white arrow) is pulled outward to release flat belt tension. Adjustments of both flat belt and V-belt tensions are easy to reach. Multiple V-Belt Drive transmits power from cone pulley to spindle.

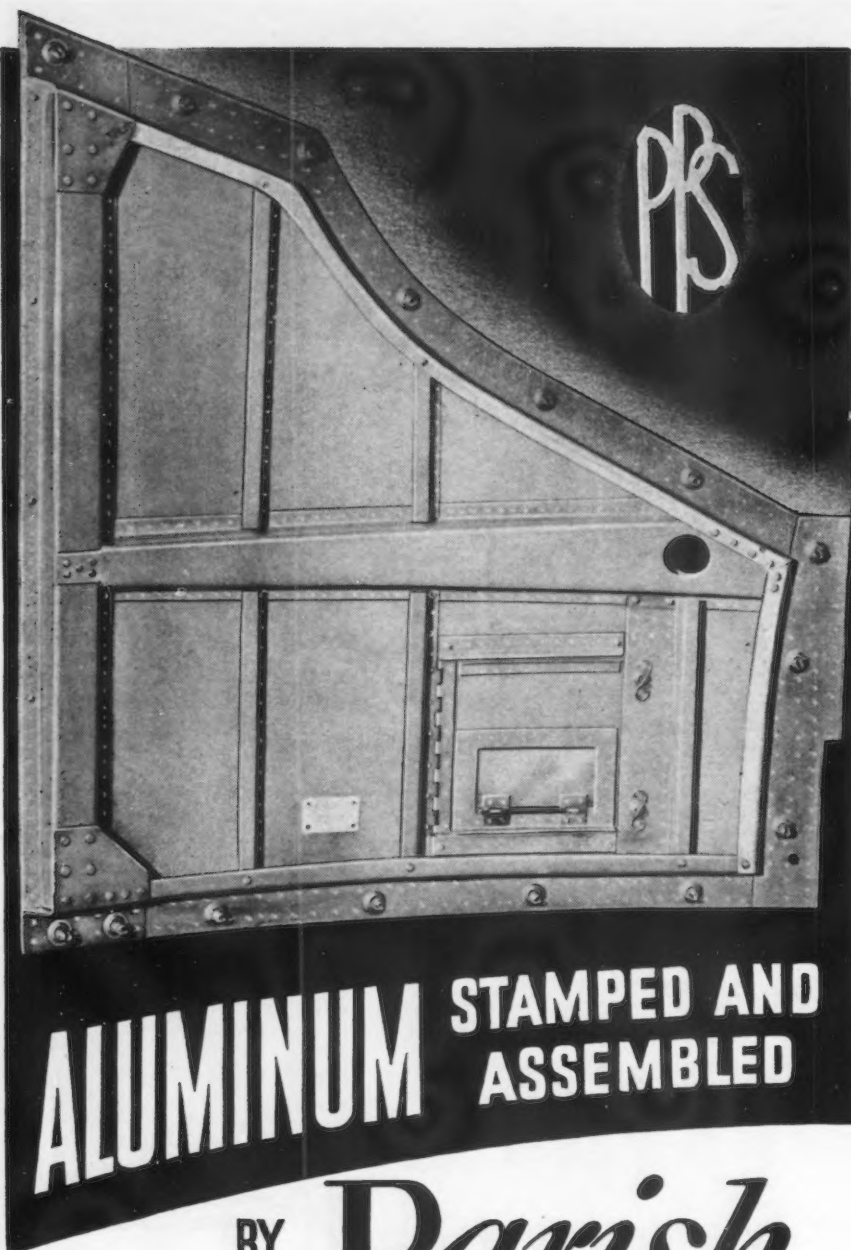
**BRIEF SPECIFICATIONS:** Swing over bed, 10 1/2" . . . bed length, 43 1/2" . . . spindle hole, 3/4" . . . precision ground ways: 2 prismatic V-ways; 2 flat ways . . . 12 spindle speeds, 30 to 1450 r.p.m. . . . worm drive from lead screw spindle for power feeds . . . friction clutch on power feeds . . . longitudinal feed .0015 to .000" per spindle revolution . . . cross feed .25 times longitudinal feed . . . half nut drive from lead screw for thread cutting . . . Threads, 48 selections RH or LH, 4 to 224 per inch . . . self lubricating bronze bearings at 40 separate points.

*Logan*

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A NAME TO REMEMBER WHEN YOU THINK OF LATHES



Rigid adherence to specifications, speed of production and low cost feature Parish Aluminum Stampings. From preliminary design to finished assembly, every detail is handled in the Parish plant. Discuss your parts and assembly requirements with Parish engineers to determine how metal stampings may help you achieve greater production at lower costs.

*Modern Design at Low Cost*

**Parish Pressed Steel Co.**

Subsidiary of SPICER MFG. CORP., READING, PA.

Western Representative: F. Somers Peterson, 57 California St., San Francisco, Calif.

nual commission earned during the years 1935 to 1939" this particular representative will average only 19% of what he did previously.

In another case, the manufacturer's total sales were only 16 per cent last year of what they were in 1940, and this year they have been practically nil. Their representative has not even been given permission by the Australian Government to bring in necessary repair parts.

The feeling in Australia is, and this feeling is apparently shared by American manufacturers, that while some of the Lend Lease figures are large, there has been such an interference with commercial shipments that the representatives cannot live on anything like a 1 per cent commission paid on Lend Lease orders.

Further objection is made in Australia, and again apparently shared in the United States, that inasmuch as British shipments are made entirely through commercial channels to Australia and British manufacturers are permitted to remunerate their representatives in the usual manner, the result of this situation is that American trade is discriminated against.

Thus, the Australian Government is placed in the position of accepting Lend Lease aid from the United States and at the same time drying up the channels of American trade in Australia and turning the trade over to competitive manufacturers in Great Britain.

Another aspect of the situation is, of course, that agreements made in good faith between Australian firms and American manufacturers are being arbitrarily interfered with by the action of the Australian Government and it is reported that in the machine tool trade a "friendly" suit has already been instituted to test the validity of this interference.

"Politically," the article states, "The situation is most unfortunate not only as regards the Australian Government's seeming to throw its weight against American manufacturers in favor of British manufacturers by playing into the hands of those American legislators who are somewhat hostile to the Lend Lease program in general, since it places the American Government in the unfortunate position of extending Lend Lease aid to Australia which at the same time results in drying up our channels of trade there.

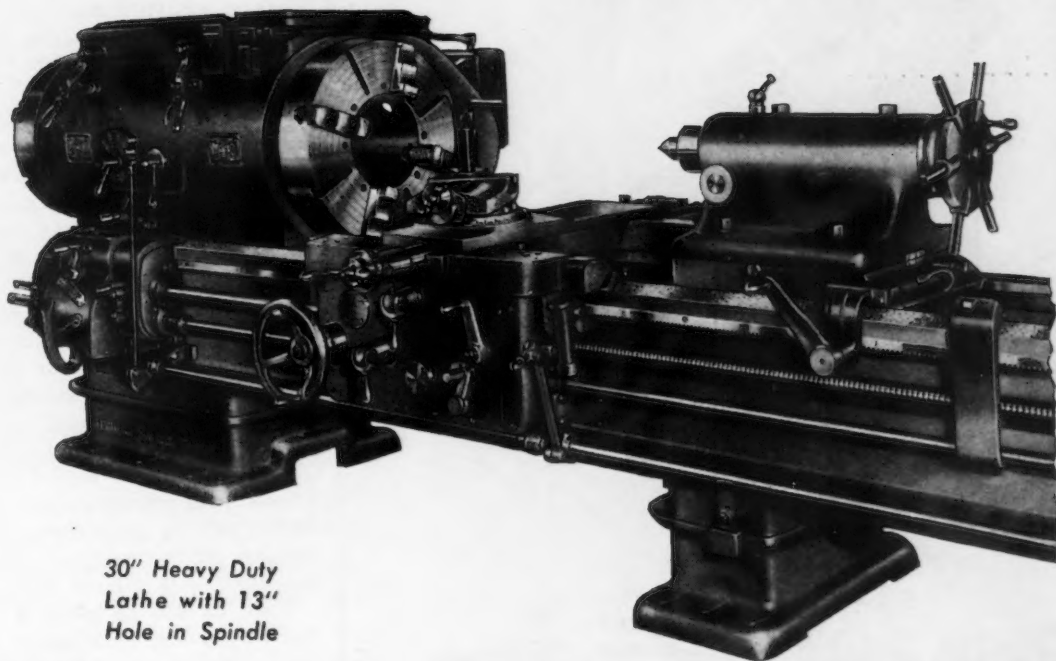
"The whole situation is fraught with possibilities of friction and injustice as to good relations."





*I Can Sure Do a  
**BETTER JOB** on a  
Hydratrol Lathe!*

***Large Hollow Spindle Type***



30" Heavy Duty  
Lathe with 13"  
Hole in Spindle

# Hydratrol Lathes

**LARGE HOLLOW SPINDLE TYPE**

**I**N hundreds of plants—under all sorts of conditions—HYDRATROL LATHES (Large Hollow Spindle Type), are doing a better job than had ever been done before. Invariably they are increasing production, improving work, cutting costs.

The chances are that YOU can "do it better" on a HYDRATROL LATHE. Why not send us prints of your difficult, unusual or too-costly

machining jobs, for a specific, time-and-money-saving recommendation.

## **Complete Line of Sizes from 18" to 36"**

Small . . . . .	18" up to 7 1/4" Hole
Medium . . . . .	24" up to 12" Hole
Large . . . . .	27" up to 13" Hole
Large . . . . .	30" up to 14" Hole
Large . . . . .	36" up to 16 1/2" Hole

(Standard Type lathes, 16" to 36")

***Lehmann* MACHINE COMPANY**

CHOUTEAU AT GRAND ★ SAINT LOUIS (3) MISSOURI

# ARE YOUR EMPLOYEES SKATING IN OIL?



## End the danger quickly with **SPEEDI-DRI**

A BLEEDING, oil-soaked floor makes a great skating-rink, but it's dangerous to life and limb, it slows production, and it's a serious fire-hazard. **SPEEDI-DRI** is your best answer. This light-reflecting, granular, oil- and grease-absorbent acts as a poultice for sick, slick floors, soaking up fresh oil rapidly and even drawing out old deposits until your floors are like new. The minute it's spread, it provides a non-skid footing that prevents many a slipping accident. What's more, it's fire-retardant! Easily spread and cleaned-up without interrupting production, it saves hours of porter-labor. **SPEEDI-DRI** has many other uses, too. Write for literature and **FREE SAMPLE**.

**SUPPLIERS:** East — Refiners Lubricating Co., New York 1, New York.  
Midwest & South — Waverly Petroleum Products Co., Philadelphia 6, Pa.  
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**SPEEDI-DRI**  
OIL AND GREASE ABSORBENT



### NEWS OF INDUSTRY

#### Program Developed For Veteran Training After War Is Over

Southbridge, Mass.

• • • A new program for the re-employment of war veterans, developed in co-operation with the Apprentice Training Services of the War Manpower Commission for use as a pattern to be followed in veteran training and rehabilitation, was announced recently by the American Optical Co. which has sent over 3000 former employees into the service.

Primarily developed to rehabilitate disabled veterans and to select for more responsible positions those men with brilliant military records, the program was fostered by a committee of WMC agencies with W. F. Patterson, director of the Apprentice Training Services, acting as chairman.

Under the program, each veteran's employment record prior to entering the service will be examined as to education, ability and experience, length of service, and progress made.

Next his service record will be reviewed with special attention to military training received, skills developed, improvement in personality, and leadership talents displayed.

Then he will be given a thorough psycho-physical examination to ascertain whether special placement or training is needed. In certain cases, for appraisal purposes, he will be given trade, interest, aptitude and temperament tests.

Information revealed by these steps will be the basis for placing each veteran in one of three groups designated as par, par plus, or par minus.

"Par" veterans are those former employees who return from the war somewhat older, but without substantial change in their interests or qualifications, and anxious to resume work where they left off. These men will be placed in their old jobs or an equivalent one, and given any training that may be necessary.

"Par Plus" veterans are those men who will return with wider experiences, greater skills, better personalities, and greater overall qualifications as a result of their military training and experience. Attempts will be made to fit these men into more responsible positions where their new abilities can best be used.

"Par Minus" veterans are those men who will return with physical or nervous changes that limit the possibility of fitting them back exactly into their former jobs.



# A FEW TYPICAL Metal Tubing AND STAMPING Assemblies

## Fabricated by Us for Other Manufacturers

● This picture shows only a few of many different kinds of metal tubing and stamping assemblies—fabricated by Noblitt-Sparks—to go into the products of other manufacturers. But this may suggest something that our company might make for your company—now or later—to your advantage as well as ours.

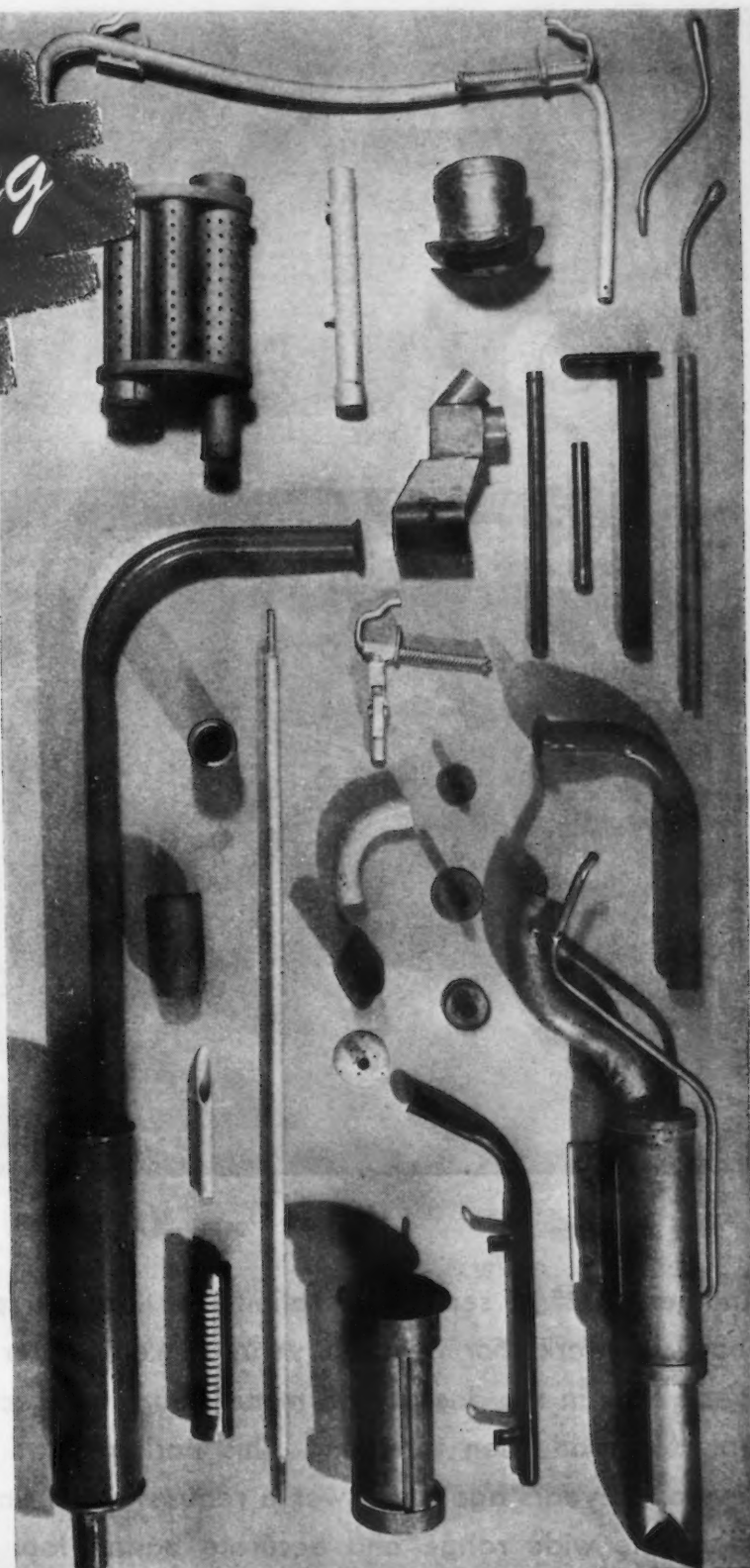
Noblitt-Sparks makes and forms metal tubing into any shape—welds it to other parts stamped from metal—assembles, plates or paints the entire unit—ready to go into your product.

With 11 plants and 25 years of experience in manufacturing, Noblitt-Sparks may have exactly what you need in engineering assistance and production facilities. When you have a specific job in mind, write or call . . .

*Harlow Foulke*

Vice-President and Director of Manufacturer's Parts Division

NOBLITT-SPARKS INDUSTRIES, INC. • COLUMBUS, IND.



# NOBLITT-SPARKS INDUSTRIES

FABRICATORS OF METAL TUBING AND STAMPING ASSEMBLIES TO MEET YOUR NEEDS

# Rickert FOR 35 YEARS Shafer

## R-S BORING HEAD

*Adjustable*

Made in 3 sizes with .001" Micrometer Adjustment for use on any drilling, turning or boring machine tool. Each size handles a wide range of work.

Another **R-S** second operation tool that will speed your war work. For over 35 years Rickert-Shafer has specialized in the design and manufacture of precision tools for production threading. This Boring Head was developed years ago to answer a request for a simple, adjustable wide range and accurate boring tool that could be adapted to any milling machine, turret lathe or drill press. Write for complete data and be sure to indicate the priority rating of your work.

**RICKERT-SHAFFER CO • ERIE, PA.**  
DIE HEADS • COLLAPSIBLE TAPS • BORING HEADS  
TAPPING MACHINES • SPECIAL THREADING MACHINES

### Down to Earth Advice Given to Foremen For Vet's Rehabilitation

New York

••• Special training of foremen for the important role they must play in the rehabilitation of veterans—particularly during the critical first few weeks of their change-over from military to civilian life—is urged in a current supplement to the *NAM News*, publication of the National Association of Manufacturers.

"The supervisor is perhaps the most important single factor in the satisfactory reabsorption of veterans in industrial jobs, says B. G. Parker, president of the Youngstown (Ohio) Foundry and Machine Co., and chairman of the NAM Committee on Supervisory Relations. "Management therefore must give its foremen as much preparatory information and guidance as possible in order to help the foremen to develop 1—the right kind of an attitude and 2—a better understanding of how to deal soundly with veterans.

"After all, the foremen's attitude, to a large extent, will determine the kind of adjustment that the veteran makes. One thoughtless act, too much coddling, an emotional approach and a hardboiled attitude may be harmful. The foremen's first interview with the veteran—the way in which he introduces the ex-serviceman to his particular job and co-workers—and the follow-up will all play their part in making the veteran feel he really belongs."

It is suggested that management provide its supervisory personnel with some training, and information on these specifics:

1—The employer's legal obligations, such as Section 8 of the Selective Service Law, particularly those provisions which relate to the veteran's rights to his former job.

2—Effect of Section 8 on the seniority practices of industry generally, along with the company's stated and contractual seniority practices.

3—The G.I. Bill of Rights, its provisions, and the various benefits it grants veterans.

4—The company's in-plant veteran employment program, especially as it concerns veterans who were former employees, veterans who are new employees but have had experience in similar work, and veterans who are being employed for the first time and need "indoctrination" into industry.

5—Human and technical problems, stressing the foreman's friendly understanding of the fact that the veteran is eager to "succeed on the job" and the fact that it is the foreman's duty to see that the veteran is given the full benefit of assistance from both the personnel and medical departments in order to fit smoothly into his working life.

6—Physically handicapped need



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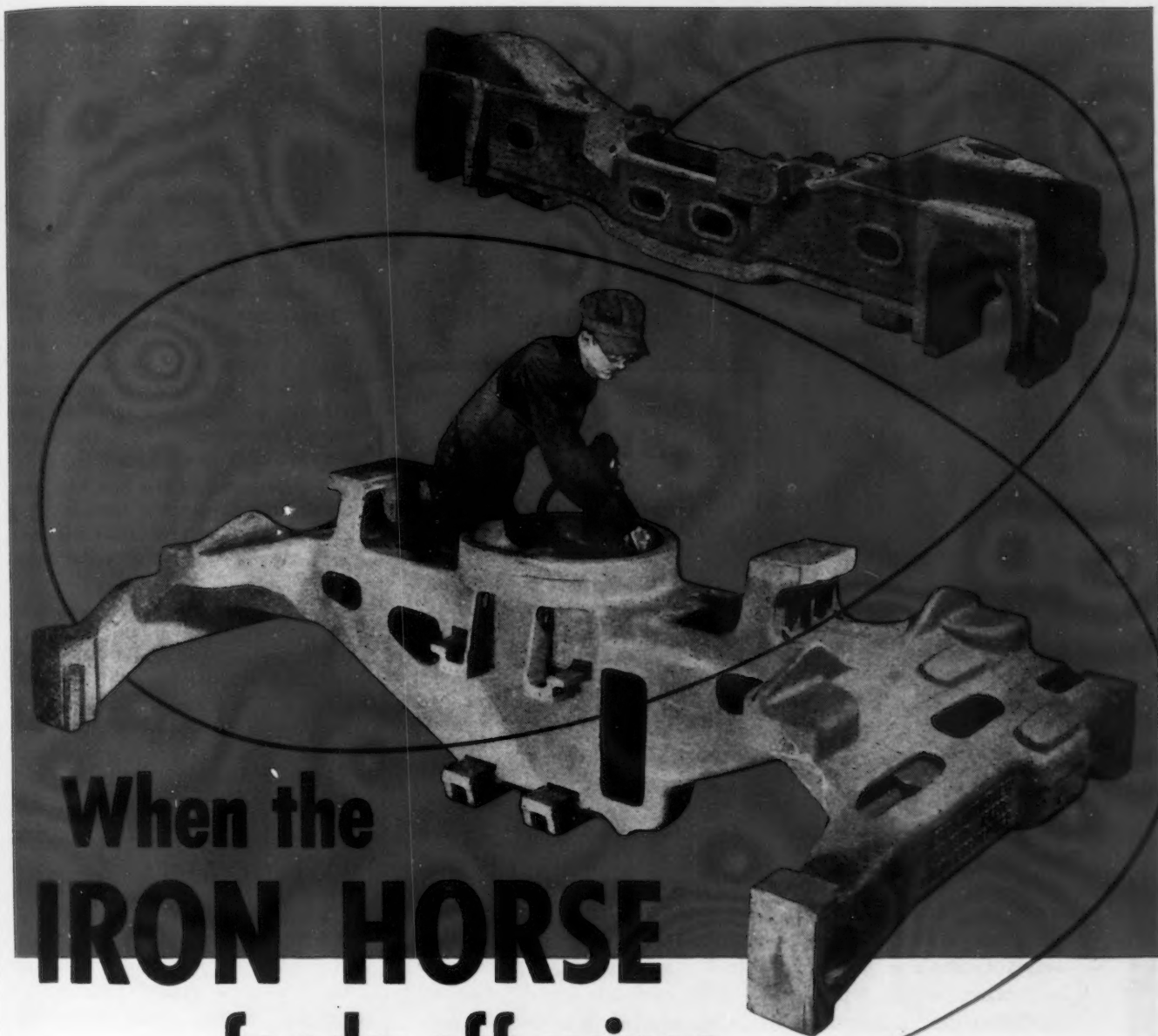
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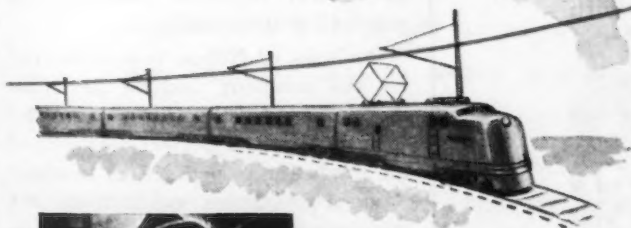
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... or when it runs on oil or steam, you'll find that PSF products have the required high strength, the clean sound grain structure and high dimensional accuracy that give you the answers for heavy cast parts. Advanced foundry methods and modern equipment are all advantages on your side when you plan on steel castings by PSF.

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Among the many kinds of Stainless Steel Wire that are rolling from the **PAGE** Mill right now are such different products as corrosion-resisting wire for airplane controls, rifle springs, lock wire, safety wire, cotter pins and binding wire for armatures.



We suggest that, if you are planning to use Stainless Wire after conversion, it might be a good idea to get in touch with **PAGE** right now. It is likely that with our experience drawing Stainless to suit a wide range of uses **PAGE** can help you with very practical suggestions *to fit your needs*.



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Get in touch with **PAGE** now, and be all set to go when civilian production is permitted again.

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**AMERICAN CHAIN & CABLE COMPANY, Inc.**  
BRIDGEPORT • CONNECTICUT

## NEWS OF INDUSTRY

proper placement and, fitted into the right job, properly trained, they are wholly productive. Veterans still undergoing medical treatment should have their time arranged so that they may continue any treatments necessary to bring them back to normal health.

"The attitude and behavior toward veterans is of such importance, that great stress must be placed upon these factors in preparing foremen for their supervisory relations with the ex-serviceman," asserts Mr. Parker. "Fellow employees particularly must be **pre-sold** by the foreman on the necessity for avoiding morbid curiosity, embarrassing questions and overly sympathetic offers of help to the physically handicapped.

"The foreman is the one best able to help the veteran slip back into the normal routine of productive life, provided the foreman fully understands the problems involved.

"Through intelligent foremen conferences, special bulletins, and all other suitable mediums, the foreman can obtain a better grasp of the many human and technical problems he will encounter in his every-day dealings with able-bodied and handicapped veterans," Mr. Parker said.

## **U. S. Rubber Perfects New Latex Cable Insulation**

*New York*

••• Nubun, a new synthetic rubber latex insulation for power, lighting and communication cable has been developed by United States Rubber Co.

The new insulation is a result of war time developments in rubber technology and will, it is claimed, permit the design of new types of wire and cable with improved electrical and physical characteristics.

Qualities of Nubun insulation cited by the company include flexibility, impermeability to water, laminated construction, and perfect centering of the conductor to produce an insulated wire of maximum conductivity and minimum diameter. The synthetic insulation is said to be exceptionally homogeneous following vulcanization and has high electrical characteristics such as di-electric strength and insulation resistance. The special synthetic rubber compound is low in specific conductive capacity, has good aging qualities because of the presence of special anti-oxidants, and will resist severe wear because by the nature of the latex process, the rubber particles are not distorted or broken down by milling.





# When Accuracy Counts

**W**HEN the sensitive hand of a world famous surgeon grasps his scalpel and with a deft stroke, makes an incision, that is when accuracy counts. When the inspector gages a component of a bomber engine, that is when accuracy counts. The very lives of our pilots and air gunners often may

depend on the accuracy of the gage.

Woodworth gages are accurate . . . fashioned to astronomically close limits, Woodworth gages are dependable . . . reduce production costs by their long service life . . . Woodworth gages possess "Accuracy You Can Trust."

Write or wire for catalog 44-G today.

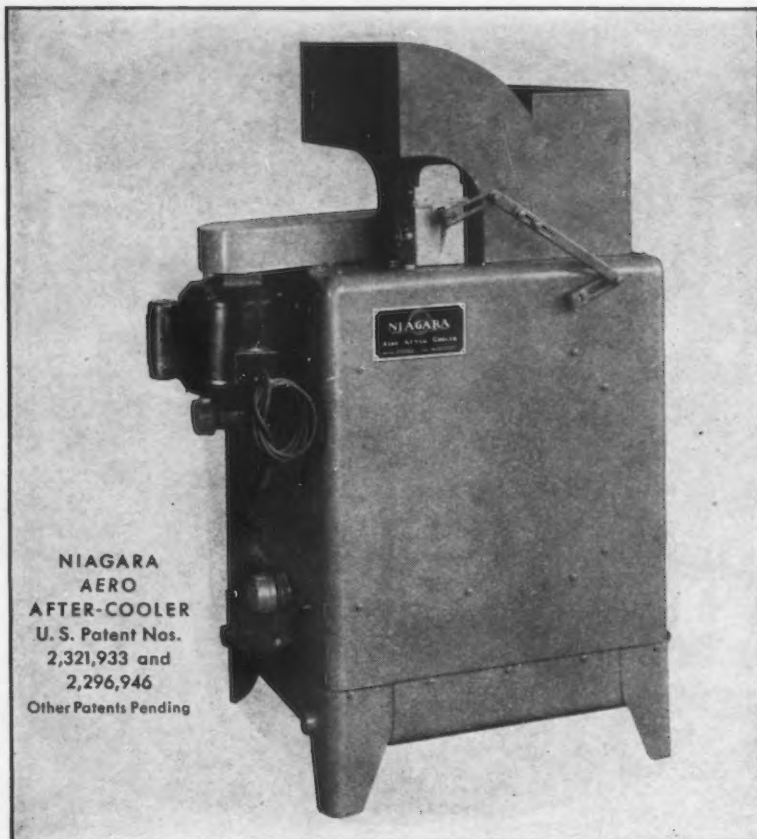
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# Keeping Water and Oil Out of COMPRESSED AIR



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AFTER-COOLER  
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2,296,946  
Other Patents Pending

● Controlled temperature cooling with the NIAGARA AERO AFTER-COOLER has been the answer to excess water and oil in compressed air lines, preventing spoilage of material when compressed air is used in process and preventing damage to pneumatic tools. No refrigeration is required.

The NIAGARA AERO AFTER-COOLER both condenses the moisture before it gets into the lines and also provides jacket water of the proper temperature to prevent condensation in the compressor, washing out the lubricating oil.

It helps produce compressed air containing only  $\frac{1}{2}$  to  $\frac{3}{4}$  as much moisture as air cooled by conventional equipment. At the same time it saves 95% of the cost of cooling water, pays for itself in a short time. Write for complete information.

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INDUSTRIAL COOLING • HEATING • DRYING  
HUMIDIFYING • AIR ENGINEERING EQUIPMENT

## NEWS OF INDUSTRY

### SAE Publishes New Technical Handbook

#### New York

• • • Wartime industrial and technical progress in developing new methods and materials facilitating war production are reflected in the SAE handbook, 1944 edition, published by Society of Automotive Engineers.

New features include: Specifications for medium- and heavy-duty coolant hoses; detailed standards for straight and taper pipe threads; standards for tractor power take-off and drawbar-hitches, including safety protectors; standards for spring lock washers; and nomenclature for pistons and piston-rings.

Revised data include: Classification of natural and synthetic rubber compounds; tables on steel hardness conversion numbers; standards for tube fittings on fuel and oil lines; and specifications for non-ferrous metals, including solders, and both cast and wrought aluminum, magnesium, brasses, bronzes, and bearing and bushing alloys.

The handbook, published and issued only by SAE, is available at SAE headquarters, 29 West 39th St., New York.

### Curtiss-Wright Develops New Electronic Flight Trainer

#### New York

• • • The development of a revolutionary electronic flight trainer has been announced by G. W. Vaughan, president of Curtiss-Wright Corp., in a discussion of important contributions to aeronautical research and developments contained in his annual report to the stockholders.

The advanced-type synthetic flight trainer embodies the Dehmel patents, according to Mr. Vaughan, and is an electronic device which is inherently so versatile that the flight characteristics and maneuvers of any single or multi-engine airplane may be simulated readily. It is one of the "Electromathics" projects of the Curtiss-Wright Development Division, of Bloomfield, N. J.

When fully developed the new flight trainer is expected to prove an important factor in solving some of the complex problems of aircraft operations by facilitating ground training of flight personnel as well as permitting preflight analysis of new types of aircraft while they are still in experimental stages.



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# SOUP KETTLES

**Whether it's Surfacing Runner Blades for a Hydroelectric Plant or Fabricating Soup Kettles for the Food Industry, ARCOS HAS THE RIGHT ELECTRODE FOR THE JOB**

There isn't space to list all the projects in which Arcos electrodes are involved. Make use of the thirteen years specialized experience of the Arcos organization for specific information on any job in

which you are interested. ★ The newly issued Arcos Specification Chart, which is yours for the asking, will give you complete data on all Arcos electrodes. Use it as your buying guide.

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Baton Rouge, La. .... Wm. D. Seymour Co.	Los Angeles, Calif. .... Victor Equipment Co.
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Buffalo, N. Y. .... Root, Neal & Co.	Montreal, Canada. G.D. Peters & Co. of Canada, Ltd.
Chicago, Ill. .... Machinery & Welder Corp.	New Orleans, La. .... Wm. D. Seymour Co.
Cincinnati, Ohio. .... Williams & Co., Inc.	New York, N. Y. .... H. Boker & Co., Inc.
Cleveland, Ohio. .... Williams & Co., Inc.	Oklahoma City, Okla. .... Hart Industrial Supply Co.
Columbus, Ohio. .... Williams & Co., Inc.	Pampa, Texas. .... Hart Industrial Supply Co.
Detroit, Michigan. .... C. E. Phillips & Co., Inc.	Pittsburgh, Pa. .... Williams & Co., Inc.
Erie, Penna. .... Boyd Welding Co.	Portland, Ore. .... J. E. Haseltine & Co.
Fresno, Calif. .... Victor Equipment Co.	Rochester, N. Y. .... Welding Supply Co.
Fl. Wayne, Ind. .... Wayne Welding Sup. Co., Inc.	San Diego, Calif. .... Victor Equipment Co.
Honolulu, Hawaii. .... Hawaiian Gas Products, Ltd.	San Francisco, Calif. .... Victor Equipment Co.
Houston, Texas. .... Champion Rivet Co. of Texas	Seattle, Wash. .... J. E. Haseltine & Co.
Kansas City, Mo. .... Welders Supply & Repair Co.	St. Louis, Mo. .... Machinery & Welder Corp.
Kingsport, Tenn. .... Slip-Not Belting Corp.	Syracuse, N. Y. .... Welding Supply Co.
	Wichita, Kansas .... Watkins, Inc.



**"QUALITY WELD METAL  
EASILY DEPOSITED"**

# HOW YOU CAN STOP TRANSMISSION OF DROP HAMMER VIBRATION AND REDUCE PLANT COSTS . . . . .

## with **KORFUND** **VIBRATION CONTROL**

**V**ibration from drop hammers, punch presses and other impact machinery can prove extremely costly—in accuracy of work on adjacent machine tools, in building and equipment maintenance, in employee efficiency, as well as in the life of the machine itself.

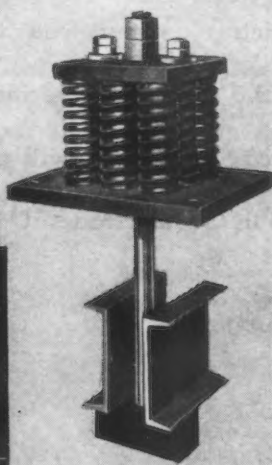
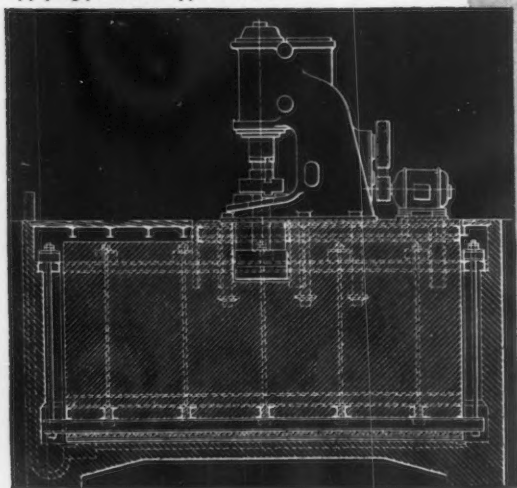
In one plant, vibration from a large drop hammer cracked fire brick, loosened refractory linings, and caused contact of metals during the heating process in nearby furnaces. In another instance, rejections from a battery of precision grinders were averaging 40% before the trouble was traced to a heavy stamping press operating several floors below in the same building.

In both plants, installation of Korfund Steel Spring Vibro Isolators under the direction of Korfund engineers eliminated destructive vibration and reduced maintenance costs in one case, and rejections in the other, to acceptable levels.

*You, too, may benefit from Korfund's more than forty years of experience in controlling the transmission of vibration. Write for further information.*

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Representatives in Principal Cities

Sectional view of hammer foundation, illustrating method of applying pendulum type isolators



## **KORFUND** **VIBRATION CONTROL**

### NEWS OF INDUSTRY

#### *Among the Week's Trade Notes*

Electro-Motive Division of General Motors Corp. is undertaking a building and alteration program at its La Grange, Ill., plant. The program is expected to be completed by next spring.

Jones & Laughlin Steel Corp., Pittsburgh, announce that a new sales office has been opened in the State Tower Building, Syracuse, N. Y. W. B. Herzog is manager.

Mercer Tube & Mfg. Co., Sharon, Pa., has opened a Chicago office in Suite 2904, Carbide and Carbon Building, 230 North Michigan Avenue. J. R. Meany will be in charge.

Fisher Furnace Co., Chicago, has purchased the industrial furnace business of the Monarch Engineering & Mfg. Co., Baltimore. The transaction gives the Fisher company all rights to manufacture Monarch equipment and includes all patterns, drawings and parts inventories.

Bound Brook Oil-Less Bearing Co. has appointed Dominion Bearings, Ltd., Toronto, as its Canadian representative.

Pomona Pump Division of the Joshua Hendy Iron Works has moved its chief administrative office to Sunnyvale, Cal., for a consolidation with the general administration of the company.

Ergolyte Mfg. Co., Philadelphia, makers of a.c. continuous arc welders and welding equipment, has opened a new plant at 3231 North Lee Street of that city "to do contract welding solely," according to an announcement made by the president of the company.

Black Industries, Mec-Rad Division, has started construction on a new building adjacent to the present plant at Cleveland, to be devoted entirely to the manufacture of mechanical and electrical components for radionics.

Laughlin Tool & Engineering Co., Sturgis, Mich., has purchased the Sutton Tool Co., Detroit.

Levinson Steel Sales Co., Pittsburgh, has been appointed exclusive distributors for Bates grates, open flooring and stair treads manufactured by Walter Bates Co., Joliet, Ill.

Bliss & Laughlin, Inc., Chicago, has acquired the New England Drawn Steel Co., Mansfield, Mass. The business will be operated as the New England Drawn Steel Division of Bliss & Laughlin, Inc.

National Motor Bearing Co., Inc., Redwood City, Cal., has announced the purchase of Arrowhead Rubber Co., Los Angeles. Through this transaction, Arrowhead becomes a wholly owned subsidiary of National Motor Bearing Co.

Clover Mfg. Co., Norwalk, Conn., makers of Clover coated abrasives and Clover lapping and grinding compounds, and the Dirats Mfg. Co., Westfield, Mass., makers of Dirats precision grinding wheels, announce an inter-company working agreement whereby each company will also handle the products of the other.

Salkover Metal Processing Co. has recently moved its Chicago plant to larger and more modern quarters at 4209 West Lake Street.

#### **Allegheny Ludlum Reports \$865,065 2nd Quarter Income** *Brackenridge, Pa.*

• • • Allegheny Ludlum Steel Corp. reported net income totaling \$865,065 for the second quarter of 1944, after provisions of \$3,143,970 for federal income and excess profits taxes and for estimated refund on account of renegotiation of war contracts. These net earnings compared with \$1,006,927 for the corresponding 1943 period.

Net income for the six months ended June 30, 1944, was \$1,665,175 after the above listed provisions, as against \$1,943,062 earned during the first half of 1943. The earnings figures shown give effect to a credit for 10 per cent excess profits tax refund.



# WHY Salt Baths ARE SPECIFIED!

It is universally admitted today that no branch of metal-working has made greater progress than heat treatment. "All purpose" furnaces are unknown, but it is a fact that electric salt bath furnaces show a wider range of usefulness than any other type. . . .

That means, specifically, Ajax-Hultgren furnaces, of which more have been installed than all other electric makes combined.

Salt bath treatment is specified in all its astonishing variety, from 350° to 2400° F. because it "controls the atmosphere" by eliminating it. . . . A salt film seals out

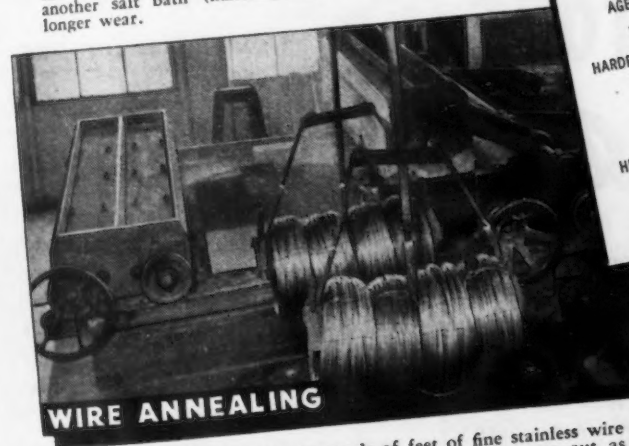
deleterious gases up to the instant of quenching, and an Ajax furnace produces more completed pieces, with fewer rejects, than any radiation or forced convection unit of the same size. . . .

There are hundreds of applications\* for which Ajax furnaces are specified. A few are shown below. Data is given in 1944 Catalog 107-B which may be had by writing: **AJAX ELECTRIC CO., Frankford Ave. at Delaware Ave., Philadelphia 23, Pa.**



**NEUTRAL HARDENING**

Conveyorized neutral hardening bath for treating spline shafts, followed by timed quench, and quench in another salt bath (martempering). Shafts show 30% longer wear.



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Process annealing hundreds of thousands of feet of fine stainless wire in the Ajax-Hultgren electric salt bath furnace which turns out as much annealed wire as 6 continuous annealing furnaces.



**CARBURIZING**

Carburizing ordnance parts in one of the largest war plants in the East. Uniform case, freedom from distortion, ability to treat selectively, are all characteristic of Ajax units.



**HEAT TREATING ALUMINUM**

The world's largest electric salt bath furnace, used for heat treatment of aluminum alloy sheet, sections, and large parts. Uniformity of heating avoids distortion.

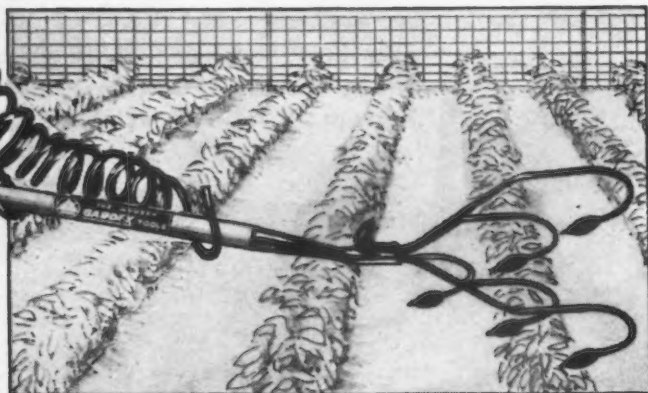
\*THERE'S AN AJAX INSTALLATION NEAR YOU!



## THE **AJAX** ELECTRIC SALT BATH FURNACE HULTGREN

**ASSOCIATE COMPANIES:** AJAX METAL COMPANY, Non-Ferrous Ingot Metal for Foundry Use  
AJAX ELECTRIC FURNACE CORPORATION, Ajax-Wyatt Induction Furnaces for Melting  
AJAX ELECTROTHERMIC CORPORATION, Ajax-Northrup Induction Furnaces for Melting, Heating  
AJAX ENGINEERING CORPORATION, Ajax-Tama-Wyatt Aluminum Melting Furnaces

# "Commando" of the VICTORY GARDENS



## \* **GARDEX** Tools Made with **KEYSTONE** *Wire*

Many a victory gardener "establishes a beachhead" in the corner of his garden and progressively "advances the attack" against weeds with his Gardex Tools.\*

Gardex Tools are built to *win* the war on weeds. The blades and prongs are made of heat-treated high carbon wire, assuring strength and stamina right down to the "fighting edge".

\*Gardex, Inc.,  
Michigan City,  
Indiana

Along with the Gardex Company, hundreds of other manufacturers use Keystone wire in their products, many of which are vital parts of planes, ships, tanks, guns, ammunition, and such vital war materiel.

**KEYSTONE STEEL & WIRE CO.**  
PEORIA 7, ILLINOIS



### Postwar Governmental Controls Seen in WPB Molding Machine Rule

#### Cleveland

• • • A probable sign of governmental control of industry in the postwar period is suspected in the latest WPB ruling on the manufacture of injection molding machines by industry members here. The new ruling extends a strict control over the manufacture of these machines through the first quarter of 1945.

There is fear expressed in some industrial quarters that reconversion and immediate postwar production will be on a basis of—"you can have this much material and this many men to make so many units." Industry in general is said to oppose such a reconversion and looks forward to having plenty of material and manpower available to enter again into the regular competitive form of business. Governmental controls over prices may not be fought too seriously, according to views expressed here providing they do not adversely affect production of necessary civilian items produced under higher wage scales than pre-war. Industry, however, is believed girding to fight men and materials controls to the last ditch.

In the injection molding machine production ruling, WPB has established strict quotas for each manufacturer which will limit the number that can be made, delivered or stocked. It is interesting to note that Lester-Phoenix is permitted two of one size and one of another size machine for delivery in the third quarter. Watson-Stillman is permitted eight, split between two sizes for the third quarter and Reed-Prentice and Hydraulic Press Mfg. Co.—none at all in that quarter.

In the fourth quarter of 1944, Lester-Phoenix will be permitted to make and ship on allocation a total of 13 machines, Hydraulic Press Mfg. Co., 25; Watson-Stillman, 21; and Reed-Prentice, 27.

These manufacturers are required to notify the WPB of production schedules for stock for a period of six months in advance broken down to production for each quarter. Allocation and manufacture permission quotas for the first quarter of 1945 have not yet been set but probably will materialize from the information demanded from these manufacturers by Oct. 1.





## Having trouble with surplus inventory?

One way to beat the excess inventory problem is to buy more of your present steel requirements from a Frasse warehouse.

By buying only what you need for immediate production, you avoid leftovers and dead stock when cancellations, cutbacks or design changes occur. Frasse stocks of cold finished bars, tubing, stainless steel, alloy, and aircraft steels and tubing are in good shape. By ordering from Frasse as you go, there's no surplus bogey to fear on cancellation day.

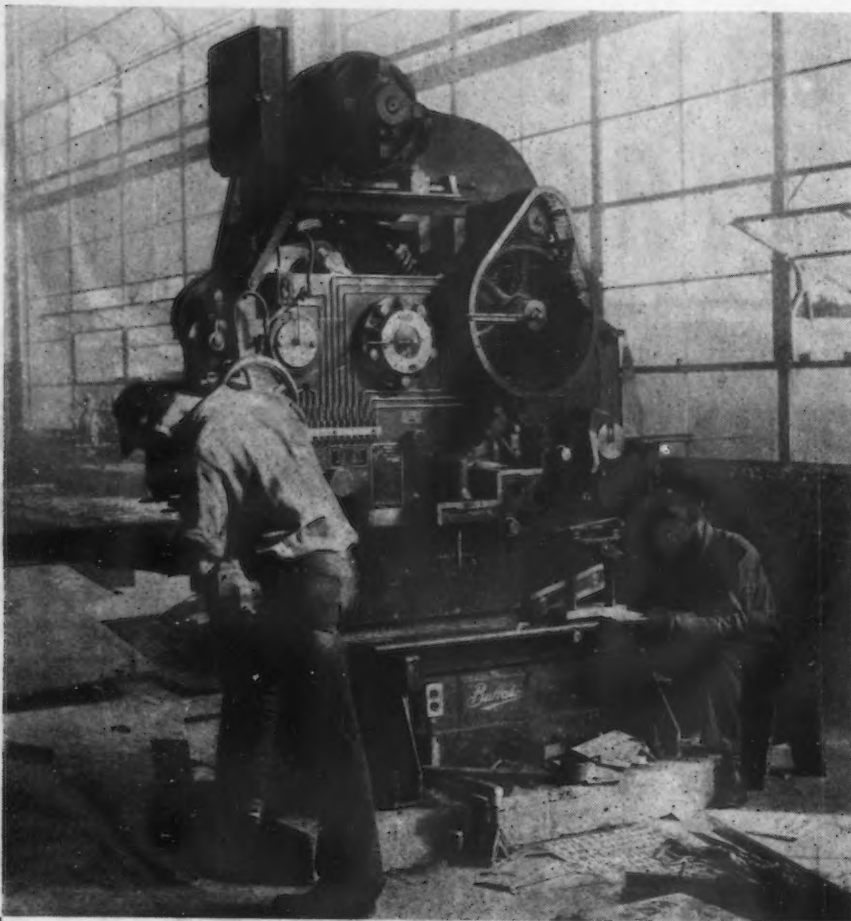
Why hamper your future operations with heavy, unwieldy surpluses that can be prevented? Start reducing yours today by using Frasse steel inventories instead.

# Frass

## MECHANICAL AND AIRCRAFT STEELS

SEAMLESS MECHANICAL AND AIRCRAFT TUBING • COLD FINISHED BARS • ALLOY STEELS  
AIRCRAFT STEELS • DRILL ROD • STAINLESS STEELS AND TUBING • COLD ROLLED STRIP AND SHEETS • WELDED STEEL TUBING

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Shipyards use many Ironworkers like this one installed in a well-known east coast shipyard.

## Putting Steel to Work

● In shipyards, tank shops, aircraft plants, in tractor factories, locomotive shops and boiler plants—wherever steel is worked up into all of the thousands of machines which make up our mechanical industries, Buffalo Universal Iron Workers are used.

These machines cut and punch metal. They are built to do a number of repetitive jobs with a minimum of adjustment and maximum speed. There are 7 sizes for use on steel plate up to 1 inch thick, angles up to 6" x 6" x 1/2 inch. From one to three men can work on a machine at the same time, cutting, punching and shearing metal.

Part of the Buffalo line of heavy-metal cutting and bending machinery, Buffalo Universal Iron Workers belong in any shop which handles plates, angles or structural shapes. In such shops, they save their cost in short order.

Bulletin 322 gives complete details. Write for a copy.

### BUFFALO FORGE COMPANY

492 Broadway

Buffalo, N. Y.

CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONTARIO

**FAST  
VERSATILE...**

*Buffalo*

**UNIVERSAL  
IRON WORKER**

## NEWS OF INDUSTRY

### War Contracts In 33 Industrial Areas Total \$120 Billion

#### New York

● ● ● War contracts awarded in 33 major industrial areas have totaled \$120 billion through May, 1944, or over \$2,500 per capita, according to figures compiled by the National Industrial Conference Board.

About 45 million civilians live in these areas, which together have a per capita average of war contracts nearly twice the corresponding national average.

Of these areas, Willow Run, Mich., has received the highest per capita awards—a total since June, 1940, of over \$16,000 for every person not in uniform. Flint, Mich., is second with almost \$8,000 for every civilian, and Wichita, Kan., is a close third with fully \$7,000 per capita.

The San Diego, Cal., and Hartford, Conn., areas have received over \$6,000 per capita, and the South Bend-La Porte, Ind., area, close to \$6,000 per capita.

New York City, with seven and a half million inhabitants, shows an average of only about \$1,000.

Up to May, 1944, a total of \$180 billion of contracts has been awarded for the country as a whole. Of this total, almost \$120 billion of prime contracts, or approximately two-thirds, has been placed in these 33 centers containing little more than a third of the civilian population.

Individual area totals range from \$1,426 million for Wichita to almost \$14 billion for Detroit. Six areas—Detroit, Los Angeles, Newark-Jersey City, New York City, Chicago, and Philadelphia—account for \$54 billion, or almost half the total for all 33 areas. These six areas have about 51 per cent of the civilian population.

● ● ● The Cleveland APUC reports that in the 12 months ending July 1, the committee had approved approximately \$267-million in new prime contracts while about \$136-million was recorded in cutbacks. It is interesting to note that the second quarter of 1944 brought in \$188-million of the new contracts but only \$34-million of the cutbacks. Donald Nelson is reported to estimate that cutbacks of more than 35 per cent can be expected shortly after the close of the German phase of the war.



# IN DIVE BOMBING LANGUAGE...

Douglas Dauntless, one of the Navy's carrier based dive bombers is equipped with Pollak bomb rack. →

## "Bomb Racks Must Operate— And Fast"

The "big moment" has arrived. Nose over, the dive bomber is hurled at the target at terrific speed. The split-second, when bombs have to be released, will arrive like a train of thought.

Here, mechanical failures just can't happen. The bomb rack must "let go"—automatically—precisely—

instantly. Pollak bomb racks and shackles are precision made of the finest alloy metals, turned out by the thousand and delivered on schedule to our Armed Forces.

### **This Pollak Ability Can Aid Your After-War Production**

The same Pollak engineering and manufacturing facilities which are producing these all-important bomb release devices, can be put to work for manufacturers

of parts and devices after the war. Some day, when peace is won and our war work is finished, the war-proven facilities here at Pollak to engineer, develop and manufacture precision products may be of help in your consumer production.

### **Consult Pollak Development Engineers, Now**

We are specialists in fabrication of the less common metals, such as Monel, Inconel and Aluminum. We also have large facilities for production in Multiple Spindle Automatics, Lathes, Milling Machines and Drill Presses.

Our development engineers will be glad to meet with your engineers, at their convenience, to discuss your after-war products. Write or wire us.

*Buy More War  
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## Find New Source Of Natural Rubber Says Russian Publication

New York

• • • The story of the successful quest for new sources of natural rubber, and the high production already achieved was told in the August issue of *Soviet Russia Today* recently. The article, by William Maxwell, Jr., says in part:

"Rubber was a major problem for the planners of Soviet Russia's industrial development. There were no home sources of supply, and to meet this problem, the Soviet Government embarked on two ventures—the manufacture of synthetic rubber and the planting of crops yielding rubber.

In synthetic rubber production the Soviets have had great success. First Soviet scientists succeeded in extracting rubber from an alcohol base. But since the alcohol was distilled from potatoes, important as a food crop, Soviet scientists sought and found a new and cheaper method. The new Soviet technique devised by Professor Favorsky derives isoprene from acetylene—which in turn is derived from water, coal and limestone. Today the USSR holds first place in synthetic rubber production.

However, synthetic rubber remains more expensive than natural rubber and is not as satisfactory for a number of industrial uses. Therefore, Soviet industry has turned to native *kauchukonossi*, or rubber-bearing plants.

A satisfactory native rubber-bearing plant was found in Central Asia. It was a weed known locally as *kok sagyz*, or chewing grass, resembling and related to the common dandelion. The rubber is found in the root.

Intensive search for new natural rubber sources began in 1929 during the first Five-Year Plan. In that year three plain Soviet citizens confounded the scientists. One of them was a railroad man in Kazakhstan in Central Asia; another was a surgeon's assistant in Azerbaidzhan in the Caucasus. These two, experimenting with the plant *hondrilla*, extracted rubber from it. The third man was a worker in a rubber factory. Hunting in the Kara Tau mountains in Central Asia he established that a common weed in that locality, named *Tau Sagyz*, or "mountain grass," was a *kauchukonos*, or rubber-bearing plant.

On January 17, 1931, there came into being a committee of scientists,



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• If you are a production executive whose responsibility includes the hardness testing of metals, you will certainly want one of these new charts for your office, shop, or laboratory. Handsome in appearance, printed in three colors, with the very minimum of advertising, it will prove its value every hour of every day. Type is large, easily read at a distance of several feet, yet the chart itself is only 24" wide and 32" high—about the size of a calendar.

Although a chart like this is relatively expensive to produce, and the quantity is rigidly limited, a copy is yours—free for the asking—if you request it on your letterhead.

Write Dept. 1A, CLARK INSTRUMENT, INC., 10200 Ford Road, Dearborn, Michigan.

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TOMORROW'S ACCURACY TODAY  
**CLARK**  
HARDNESS TESTER  
FOR "ROCKWELL" TESTING



# HOW UNCLE SAM'S AIR ARM ACQUIRED ...A LONGER REACH!



Official Photo—U. S. Air Forces

● The world sat up and took notice when U. S. fighter planes took off from America and pulled into the African theatre under their own power! And how were these planes—with a range of only a few hundred miles—able to fly such a vast distance non-stop?

The answer's simple—yet not so simple. Under wings, under bellies, they carried auxiliary gas tanks which could be drained before their regular gas containers, then detached by an ingenious method unknown before the war. Today, such tanks are stretching the range of our smaller planes on every flying front. And these quickly-detachable containers now have another use! In emergencies, they're loaded with food and medical supplies and dropped to isolated ground forces—as was done to relieve our fighters in the mountains near Cassino.

Since each of these tanks serves only once, Uncle Sam's airmen need plenty of them. And they're getting them—thanks to such high-speed production methods as employed at the American Stove Company. Realizing that the finishing line is often a bottle-neck, American Stove

chose time-saving DeVilbiss Spray Equipment to apply the protective finish required by each tank before it enters service.

In every field of war production, DeVilbiss Spray Equipment is preferred for its swift, efficient performance in all types of painting and coating operations. DeVilbiss exhaust systems, air compressors and special hose and connections are working for Victory, too. And when it comes, you can depend on *all* of these famous DeVilbiss products to help you produce the products of peacetime—quicker, better and more economically.

**THE DEVILBISS COMPANY, TOLEDO 1, OHIO**

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## DE VILBISS

### *Spray Systems*

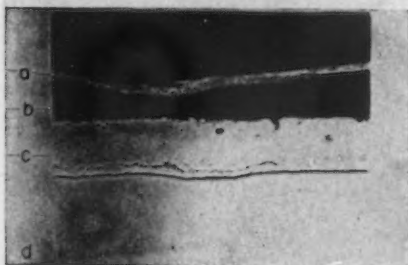
**SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS**

## Sees Regalvanizing Process In Wide Use

By GEORGE H. OHMER

Chief Engineer

Greater use of mill hot-dipped and electro-galvanized sheets and strips in postwar production is to be expected with the wide adoption of the Galv-Weld Process, which makes it possible to regalvanize welded seams and joints in galvanized sheet, plate and pipe.



Photomicrograph: Galv-Weld protected weld. (a) copper plate for specimen setup, (b) dross, (c) Galv-Weld Alloy, (d) base metal.

Already production proven in wartime service by the shipbuilding industry, this new process makes available to postwar designers the advantages of all-welded galvanized steel construction by providing 100% protection against rust and corrosion at the point of weld. An example of current planning is the use of galvanized steel for underground storage tanks. Painting is thus unnecessary as the mill galvanized coating together with the protection of the welds by Galv-Weld Alloy offers the greatest possible resistance to soil corrosion. Transmission towers, too, are undergoing redesign to utilize welded rather than the conventional bolted type of construction. Made possible by the Galv-Weld Process, the welded tower offers combined advantages of greater strength, ease of erection and lower cost. New designs and greater durability in welded galvanized steel buildings for farm and industry are also sure to appear with the extension of the use of this new regalvanizing process.

Manufacturers of equipment used in oil, meat packing, rendering and process industries can profit by lower manufacturing costs and a superior product by employing this new protective measure. Structures formerly requiring hot-dip galvanizing after full or partial fabrication may now be constructed from mill galvanized sheets and strips. Galvanized piping may also be welded to provide leakproof and rust free construction not previously always attained by the threaded joint.

Those with present or postwar products utilizing galvanized sheet, plate or pipe may obtain complete information on the Galv-Weld Process by writing Galv-Weld Products, Dayton 10, Ohio.

one of whose chief movers was Academician N. I. Vavilov.

In the next three years some thirty major expeditions were organized which collected and studied nearly 5000 specimens. These came from over 1000 species belonging to 316 plant genera. Of the nearly 5000 specimens collected, over 600 contained at least a trace of rubber.

A Kauchukonos Department was established. Thirteen farms were turned over to it for experimental cultivation of the plants discovered. Research institutions in rubber planting were organized at Moscow and Margoshev with branches in the Ukraine, the Caucasus and Central Asia.

On a July day in 1931, there were six young men and women on the express to Frunze, capital of the Kirgiz Soviet Republic in Central Asia. The six were rubber hunters whose qualifications as researchers had been approved by the Moscow Rubber Institute. Similar groups were traveling to other parts of the vast country on the same quest. The leader of this particular expedition, Bukhanevich, was only twenty-two years old. He was a worker in a Moscow aniline dye factory.

His five comrades were young workers of similar interests. They were on their way to spend their vacation in examining the flora of the mountain

**FOUR-BLADED WARPLANE PROPELLER:** Workers prepare a giant warplane propeller for testing at the Caldwell, N. J., plant of the Curtiss-Wright Corp. The new, four-bladed propeller has been under development by the Propeller Division and the AAF Materiel Command for three years.



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Chicago Detroit New York





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It is formed on an Automatic from hex bar stock; the threads are precision rolled, and the cross hole is drilled and countersunk.

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The American Hardware Corporation, Successor  
NEW BRITAIN, CONNECTICUT



borderland that touches on Chinese Sinkiang. They climbed steep mountain slopes; they descended into deep ravines. Their herbarium began to overflow; but up to the last day of their expedition they still had not found any plant with an appreciable rubber content.

Bukhanevich, however, had observed that the natives had a habit of chewing grass. He tested the grasses that they chewed, and all showed some rubber traces but not enough. In the little mountain village where they found themselves on the last day before their return to Moscow, Bukhanevich noticed the village children chewing away with particular relish. The plant they were chewing proved to be a local sort of dandelion, a plant Bukhanevich had not yet tested.

"What is its name?" asked Bukhanevich.

"Oh, it has no name," the children replied. "It's just ordinary chewing grass, kok sagyz."

The kok sagyz plants and the seeds brought back by the Bukhanevich expedition were distributed to agricultural stations. Overnight, kok sagyz, the weed from Central Asia, became one of the most important plants in the country. Bukhanevich received a large money prize and government honors.

Two years after its discovery in 1933, large scale planting of kok sagyz was begun; and from this large scale planting information poured in. The speed with which this knowledge was gained was due to the Soviet linking of scientific experiments with practical field work. The scientific minded, practical farmers on the Soviet collectives, poured in reports to the research centers, supplying data which would have taken long years to work out in the laboratories. It is such collaboration between planter in the field and researcher in the field station that made kok sagyz, like other Soviet agricultural triumphs, possible.

It was found that the rubber in kok sagyz averaged four and one-half per cent of the root weight; that it can be extracted the first year after growth, which makes it highly important in the war emergency years; and that the rubber content gains both in quantity and quality if the root is permitted another one or two years' growth. So far, the best method found for extraction is to dry the root, powder it and then by gravity or centrifuging, separating the rubber out in a water or alkaline solution.



## IT'S CORBIN... TWO to ONE for Better Fastening

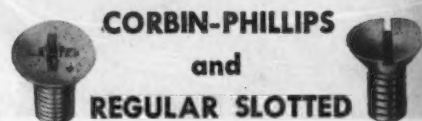
Methods are open to choice—but there's only one uniform quality for better fastening. Your assemblies may call for Regular Slotted or Phillips-Recessed Heads. In either case they call for CORBIN Screws.

Take sheet metal screws, for example. You'll find correctly centered heads, slots or recesses clean-cut and truly formed, threads and points sharp and burr-free.

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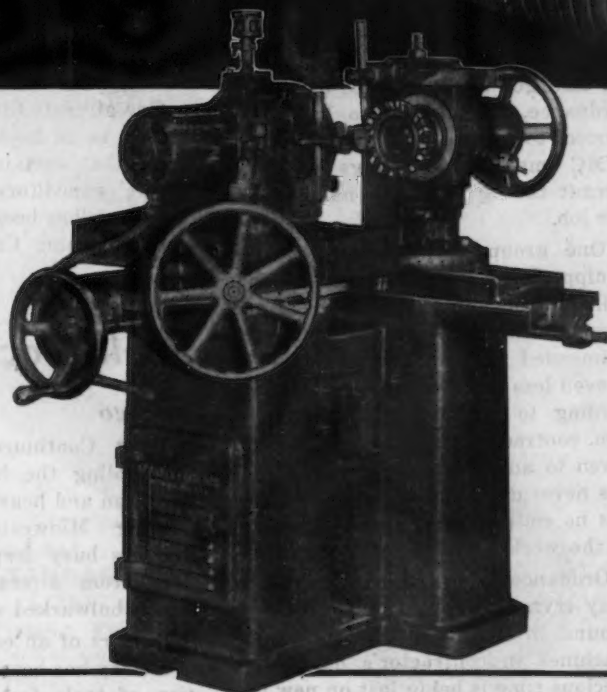


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Avoid waste of valuable productive time by constant changing of face mill cutters. The Milwaukee Face Mill Grinder sharpens each tooth accurately — makes cutters last longer — require less frequent re-grinding — decreases "down-time" on your milling machines.

An indispensable machine of strength, precision and capacity, the Milwaukee Grinder grinds Tungsten Carbide and other cutters, ranging from 3 inch to 16 inch diameters, to within .0002 runout — and does it fast.



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# MACHINE TOOLS

... News and Market Activities

## Ordnance Shell Program Criticized

### Cleveland

• • • The Ordnance Department here is being heavily scored by certain machine tool people for alleged bungling of the tooling program for the heavy shell program. An investigation of the matter by THE IRON AGE indicates that a good bit of "reverse-English" is being used but that a group of utterly sincere if somewhat harassed Ordnance men are doing their best with a very knotty problem.

The blame, if any, appears to lie on all sides, including bad luck. A shipment of lathes from an Ohio ordnance plant being shipped to New England for retooling, for instance, was damaged in a train wreck. A plant in Fort Wayne, on the other hand, which was equipped and could have assumed an enlarged shell contract offered by Ordnance, is reported to have been forced to refuse the order because WMC employment ceilings would not permit taking on additional help for the job.

One group of lathes in the area equipped with 5 hp. motors which had failed to machine 37 mm. shells successfully are inadvertently being recommended for an 81 mm. job which is even less likely to be successful, according to one source. Another 81 mm. contract is reported to have been given to an enameling firm here that has never done any metal cutting and has no equipment or personnel suited to the work.

Ordnance, according to reports is so busy trying to save time by rushing around in an attempt to place idle machines in contractor's hands that precious time is being lost on new tool schedules everywhere this effort fails.

• Ordnance is also being criticized for placing such a bulk of machine tool orders with other than old line companies. One war baby is being flooded with tool orders on the strength of earlier deliveries which old line tool builders say cannot be met. Promises of September deliveries are reported being made by some new tool builders on AA-3 priorities when bearings, mandrels, hydraulic pumps and other components cannot be bought even for October delivery on such a priority, according to other builders.

Alleged ordnance favoritism of such firms is also scored on the complaint

that certain new tool builders require as much as an 85 per cent financial advance on contracts to equip for the jobs and consequently have only a 15 per cent actual investment compared with a 100 per cent investment on the part of old line builders.

A great many tools are being removed from local shops where additional shell work cannot be handled and moved to new shell contractors' shops. One plant in Salem is losing a number of tools to a Sandusky shell contractor and odd tools from surplus stocks everywhere in the vicinity are being moved in. The criticism in some cases here is that the variety of tools will be so great that work cannot be transferred from one to another in case of a breakdown, and repair parts stocking will be almost impossible.

One aircraft fittings plant, which is said to be so loaded with this type of work that certain aircraft manufacturers' expeditors practically live at the plant, has been loaded with a huge fuze program. Critics of the employ-

ment ceiling halter at Fort Wayne point to this and ask how men to do the additional work can be supplied legally.

Another plant here is reported to have been making 60 mm. shell and to have been induced to give up this contract to take on an 81 mm. contract on the promise that equipment would be supplied. So far the equipment has been very slow coming and the tooling even slower.

This sounds like considerable muddle and criticism but the facts indicate that the major Ordnance policy is to utilize the surplus and idle tools available immediately to eliminate the time lag that is inevitable if new tools must be procured. The unavoidable and perhaps unforeseeable feature is that much of the idle and surplus equipment does not fit the new programs very well and adaptation is proving slower and more expensive than new tooling in many cases. While the Ordnance department may have invited some criticisms of its methods by some of its actions, investigation shows that everything done here so far has been done in the interest of time saving.

## Shell Machinery Deliveries into 1945

### Chicago

• • • Continued insistent demand for tooling the heavy artillery ammunition and heavy truck programs is keeping Midwestern machine tool builders busy despite slacking of orders from aircraft engine builders which bulwarked demand this spring.

Rumors of an early end of the war in no way has been reflected in production of tools for the shell program. Some shell machinery orders do not call for delivery until after Christmas. The new crop, particularly, lays greater emphasis on automaticity, and it is apparent that a preponderance of women workers in the heavy shell lines has cast its shadow on design of tools and handling equipment. Because of their great bulk and weight, making even loading of machines by hand an impossibility for women, most of the 155 mm. and 240 mm. shells will pass through machining operations virtually untouched by human hand. Special automatic vertical shell lathes, mounting several spindles, and carrying a

large number of tools, will speed production considerably.

The top-priority heavy truck program is keeping constant pressure on makers of certain types of equipment. Increased emphasis on tank-automotive group work provides a deadly competitive demand for many tools of the same type.

Meanwhile, there is no indication that lend-lease buying for Russia, which threw heavy orders to some shops this spring, is approaching a conclusion. Both in the shops and on estimators' desks is evidence that devastated manufacturing areas are being rebuilt and retooled.

Although total business is on a considerably lower level than a year ago, manufacturers are under almost an equal amount of pressure because their crews have been reduced by draft and turnover. The draft apparently has hit particularly hard in the Rockford area, where the labor force building machine tools in some plants now approximates only one-half of peak employment.



# Pre-War Speed in Delivery



## CADILLAC *Thread Plug* GAGES

ALL  
STANDARD  
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NATIONAL COARSE  
0-80 to 1½-6  
ALSO  
PIPE PLUG GAGES  
⅛ to 1¼

WHEN you order Cadillac Standard Thread Plug Gages, you get the same speedy delivery as in pre-war days—immediate shipment on rush orders, and 24-hour shipment on all others.

This is because our plant is devoted exclusively to the production of this type of gage. Consequently, except on extremely rare occasions, our stock is always adequate

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CADILLAC GAGE COMPANY, Detroit 5

# NON-FERROUS METALS

... News and Market Activities

## Magnesium Production Fosters Use

••• The use of fabricated magnesium products in the postwar market should be encouraged by the quantity of metal available. Prior to the war the nation was producing at a rate slightly over 6,000,000 lb. per year. Under the impetus of British and French aircraft orders, the magnesium industry began to expand production facilities, and government plants also were constructed. By 1941 production had grown to approximately 33,000,000 lb. per year. Production figures have soared higher and higher until now about 36,000,000 lb. of magnesium are being produced in the United States every month. If peak production is achieved in 1944, the figure may exceed 500 million lb. annually.

The price of magnesium ingot has dropped as markets and production facilities increased. From \$5.00 per lb. in 1915, ingot fell to 27c. per lb. in 1939, and in 1943, dropped to 20½c. per lb. Weight for weight, magnesium is more costly than the other common commercial metals. Nevertheless, the price per unit of volume gives magnesium an edge over some competitive metals because of its light weight.

Magnesium is produced by 11 firms that operate 15 plants, each of which utilizes one of three basic processes. Magnesium is produced by the electrolytic reduction of fused magnesium chloride recovered from brine, sea water, magnesium salts, and magnesite. Other processes employ the direct reduction of magnesium oxide by using either carbon or ferro-silicon

as a reducing agent.

The number of magnesium fabricators in the United States has multiplied 25 times since 1939. In that year there were only four major fabricators and today there are nearly 100. Of these, approximately 67 are producing sand castings, permanent mold castings, die castings and extrusions; 18 are producers of magnesium powder, and 14 are making incendiary bomb casings.

### Cleveland

••• Magnesium production took a serious blow here about 10 days ago when one plant of National Smelting was burned out. This affected the largest producer of magnesium ingots east of the Rockies. With this unit seriously limited in production temporarily the local market for magnesium scrap has gone begging. Good supply has been reported and this backlog is currently building up. National reports that its operations are about 2/3 restored but that an additional two weeks will be required before anything like normal operations can be expected.

The magnesium market as a whole appears to be very easy, and the government is taking advantage of this easiness to cut off most of the high cost producers. Three reductions in magnesium capacity have been made recently, mostly among high cost operations, the latest being a reduction of 7,000,000 lb. per month made last week. This means of balancing sup-

ply and demand is resorted to while additional demand is being encouraged through WPB solicitations to use magnesium in other than war products and generally to expand its use.

This particular effort is not making much headway since the WMC has put the crimp on almost all concerns which might consider the use of magnesium for expanded use through manpower halts. WPB on one hand dangles the fat prize of a new material which can be obtained for civilian production and WMC withholds the right to use the metal by declaring insufficient manpower for production without affecting the war effort.

Aluminum scrap is also reported plentiful and will probably continue to be as war uses of the metal are expanded while smelting is being reduced in an effort to stabilize the market. Here again the differences of the WPB and WMC are restraining the use of now excess aluminum in civilian products on the plea of manpower stringencies.

One vacuum cleaner firm in this area has been actively contacting WPB in an effort to get a go ahead on making some vacuum cleaner parts and assemblies on a limited "spare time" basis. Plenty of aluminum is available but the green light has been withheld since the spare time angle in a Class I labor shortage area is hard to prove to WMC. The fact of the matter is that all plants have a certain amount of spare time which unavoidably occurs between setups, while waiting for material or components and for a number of reasons.

Copper Statistics Reported by the Copper Institute, July, 1944  
In Tons of 2000 Pounds

U. S. Duty Free Copper	Production		Deliveries to Customers			Refined Stocks (C)	Stock Increases or Decreases		
	Crude (A)	Refined	Domestic (B)	Export	Total	End of Period	Blister (D)	Refined	Total
Year.....1941	1,016,996	1,065,667	1,545,541	307	1,545,848	75,564	D 48,671	D 67,208	D 115,879
Year.....1942	1,152,344	1,135,708	1,635,236		1,635,236	65,309	I 16,636	D 10,255	I 6,381
Year.....1943	1,194,699	1,206,871	1,643,677		1,643,677	52,121	D 12,172	D 13,188	D 25,360
7 Mos.....1944	654,665	660,495	966,622		966,622	48,050	D 5,830	D 4,071	D 9,901
February.....1944	95,713	87,128	124,532		124,532	36,489	I 8,585	D 9,311	D 726
March.....1944	101,289	99,118	156,083		156,083	37,259	I 2,171	I 770	I 2,941
April.....1944	92,779	95,280	155,877		155,877	38,392	D 2,501	I 1,123	D 1,378
May.....1944	94,624	98,580	165,714		165,714	37,074	D 3,956	D 1,308	D 5,264
June.....1944	89,102c	93,958	140,932		140,932	42,467	D 4,856c	I 5,393	I 537c
July.....1944	85,734	93,650	121,705		121,705	48,050	D 7,916	I 5,583	D 2,333

(A)—Mine or Smelter Production or Shipments, and Custom Intake Including Scrap.

(B)—Beginning March, 1941, Includes Deliveries of Duty Paid Foreign Copper for Domestic Consumption.

(C)—At Refineries, on Consignment and in Exchange Warehouses, but not including Consumers' Stocks at their Plants or Warehouses.

(D)—Computed by difference between Mine and Refined Production.

c—Corrected.

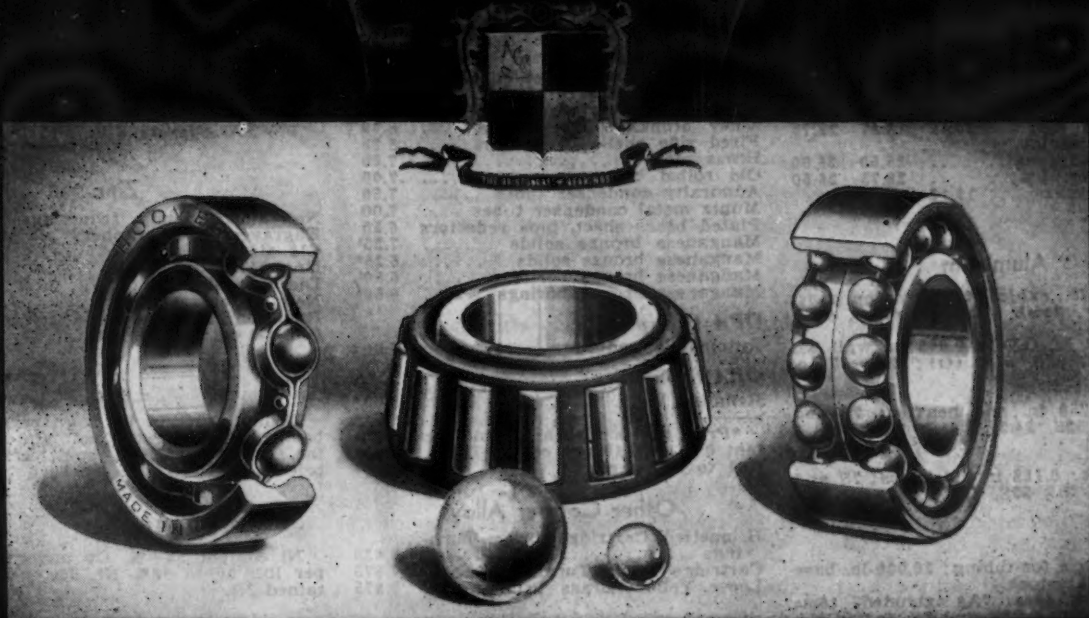
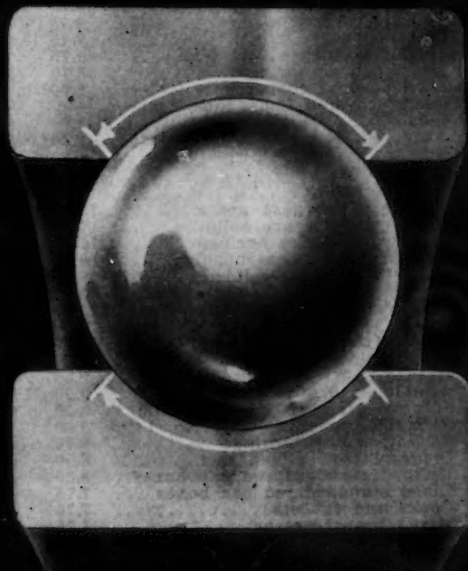


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# NON-FERROUS METALS

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(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd	15.00
Aluminum, No. 12 Fdy., (No. 2)	12.00
Aluminum, deoxidizing grades	11.00 to 12.25
Antimony, Asiatic, New York	Nominal
Antimony, American, f.o.b. Laredo, Tex.	14.50
Arsenic, prime white, 99%	4.00
Brass, 85-5-5 ingots (No. 115)	13.00
Cadmium, del'd	90.00
Cobalt, 97-99% (dollars per lb.)	\$2.11
Copper, electro, Conn. Valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Copper, beryllium, 3.75-4.35% Be; dollars per lb. contained Be.	\$15.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Iridium, 99.5%, dollars per troy oz.	\$7.50
Iridium, dollars per troy oz.	\$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	30.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$103 to \$105.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

## Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	20.87	20.87
Copper, H.R.	17.37	17.37	17.37
Copper, drawn	18.37	18.37	18.37
Low brass, 80%	20.40	20.15	20.15
High brass	19.48	19.48	19.48
Red brass, 85%	20.61	20.36	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	15.01	15.01	15.01
Commercial bronze, 90%	21.32	21.07	21.07
Commercial bronze, 95%	21.53	21.28	21.28
Manganese bronze	24.00	23.00	23.00
Phos. bronze, A. B.	20.12	18.87	22.75
Everdur, Herculey, Olympic or equal	25.50	26.00	26.00
Nickel silver, 5%	28.75	26.50	26.50
Architect bronze	19.12	19.12	19.12

## Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/2 H); 52S, 61c. (O); 24S, 67 1/2 c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 52S, factor No. 1 to 4, 23c.; 61S, factor No. 1 to 4, 28 1/2 c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2 c. per lb.; 1/2 in., 26c.; 3/4 in., 24 1/2 c.; 1 in., 23c. Hexagonals: 1/4 in., 34 1/2 c. per lb.; 1/2 in., 28 1/2 c.; 3/4 in., 26 1/2 c.; 1 in., 25 1/2 c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 3/4 in., 24c.; 1 in., 24c.

23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.137 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2 c.

## NON-FERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quantity, quantity and special preparation premiums)

### Copper, Copper Base Alloys

#### OPA Group 1

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00
Lead covered telephone, power cable	6.04
Insulated copper	5.10

#### OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50
Low lead bronze borings	11.50
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00
High lead bronze borings	10.00
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

#### OPA Group 3

Yellow brass soft sheet clippings	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25
Manganese bronze solids	6.25
Manganese bronze borings	6.50
Manganese bronze borings	5.50

#### OPA Group 4

Automobile radiators	7.00
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#### OPA Group 5

Refinery brass	5.00
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\*Price varies with analysis. \*Lead content 0.00 to 0.40 per cent. \*Lead content 0.41 to 1.00 per cent.

### Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

## ELECTROPLATING ANODES AND CHEMICALS

### Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25 1/4
Electrolytic, full size	22 1/4
cut to size	30 1/4
Rolled, oval, straight, 15 in. and longer	23 1/4
Curved	24 1/4
Brass: Cast, 32-20, elliptical, 15 in. and longer	23 1/4
Zinc: Cast, 99.99, 16 in. and over	16 1/4
Nickel: 95% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

### Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

### Aluminum

#### Plant scrap, segregated

All S-type alloys (except 2S)	8.50
2S solids	8.00
High grade alloys	7.00
Low grade alloys	6.50
Borings and turnings	
High grade alloys	5.50
Low grade alloys	5.00

#### Plant scrap, mixed

All solids	6.00
Borings and turnings	4.00

#### Obsolete scrap

Pure cable	3.00
Old sheet and utensils	7.00
Old castings and forgings	6.50
Pistons, free of struts	6.50
Pistons, with struts	4.50
Old alloy sheet	5.50

For old castings and forgings, pistons, sheets, add 1/4 c. lb. for lots 1000 to 19,999 lb.; for other scrap add 1c.; for lots over 19,999 lb. add 1 1/4 c. a lb.

### Magnesium

#### Segregated plant scrap

Pure solids and all other solids, exempt	
Boring and turnings	3.00

#### Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

### Zinc

New zinc clippings, trimmings	7.25
Engravers' lithographers plates	7.25
Old zinc scrap	5.75
Unswaged zinc dross	5.80
Die cast slab	6.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

### Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

### Nickel

Ni content 98+%, Cu under 1/2%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.



# ★ SALEM

## Batch Type Ingot Heating Furnace

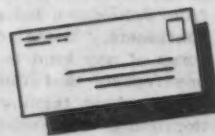
● Rugged construction with water-cooled door frames, plus automatic heating controls make the recuperative type Salem ingot heating furnace an efficient, economical, heavy tonnage producer. The furnace handles ingots as large as 22x53x78 at a heating rate of 6.4 tons per hour.

By placing ingots on edges with space between, heat penetrates each side of the ingots uniformly. Special firing and recuperation of air nets as much as 30% saving in fuel costs, as shown by actual operating records.

Economy from any furnace installation results from correct application of heat, right type of burners, and proper installation. As builders of all sizes and types of heat treating furnaces and circular soaking pits, Salem specializes in automatically controlled heat, properly applied.

Salem builds heat treating furnaces for oil, gas, or electric firing. The installation described above uses coke oven gas.

*Your furnace inquiry to Salem  
will receive prompt attention.*



### PATENTED NEEDLE PRINCIPLE

The Salem Recuperators used in Salem-built furnaces are made of a special alloy steel known as "Lisconite" and should not be confused with the conventional refractory recuperator.



## SALEM ENGINEERING CO. • SALEM, OHIO

## Heavy Melting Selling Off

• • • The current policy of most steel producers to buy as little scrap as possible is believed to be the result of attempting to glean a little profit. It has been frankly stated by some steel producers that steel prices are so low in comparison with costs that the only way profit can be made is by reducing the costs of raw materials if possible. Since ore, coal, coke and limestone remain nearly constant at captive operating costs, the only purchased material where "bargaining" can aid is in the purchase of scrap. Steel prices cannot be increased, the cost of labor cannot be reduced and most raw materials cannot be bought cheaper, therefore, the policy of cautious scrap buying. The scrap market has felt the full effects of this situation for a number of months.

In different sections of the country, the slow market for iron and steel scrap is attributed to the summer heat, the manpower shortage, government regulations and the state of the war. While all these factors influence the market, the last is by far the most important. Dealers see nothing objectionable in a normal drop in market prices were a full termination of the war in sight. But it is the feeling that the weakening of the market at this time may be hazardous to our cause should large quantities of scrap be required for immediately needed munitions.

The effect of the lowered mill requirements for purchased scrap over a period of time is at last apparent on the price structure. There is a general trend toward abandonment of payment of springboard differentials for shipments out of normal market areas. Now in the New York and Philadelphia areas at least there is a drop of heavy melting stock from 50c. to \$1.00 below ceilings.

**PITTSBURGH**—The springboard price is getting harder to obtain in this area daily, with only the 33c. springboard from Johnstown being paid by Pittsburgh consumers. Some dealers report that scrap of any kind is hard to move, while one reports that the turnover on everything except turnings and low alloys is improving. Noteworthy was the mention that low phos was moving pretty good. It is expected that some scrap may be coming up from the south within a short time that is now going into Sparrows Point. With two South-Eastern Ohio consumers out of the market, more of

this material from the south may start moving into the Pittsburgh area. However, the fact that consumers refuse to pay the freight differential may hamper the flow of scrap from this area.

**CHICAGO**—Superficial signs of additional price weakness evident in other districts have been lacking to date in the Chicago market, which appears to be absolutely stagnated. Mills are still accepting heavy melting steel at ceiling prices but one buyer now looks askance at bundled machine shop turnings. Most vulnerable of the better grades pricewise appears to be railroad scrap with buyers in outlying districts reported turning down allocations at ceiling prices. Isolated transactions of a few weeks ago in blast furnace material where ceiling prices were paid failed to establish a new price and the short shoveling turnings market remains at a \$2 discount, with no buyers. Yards are working overtime in an effort to prepare and dispose of all material. Consumers universally are engaged in an effort to shave inventories.

**BOSTON**—Scrap continues to move on Lackawanna account. Allocations in this case were spread all over New England. Shipments against the 3000 tons low phos purchased by a New England consumer have been completed, and a request for another 3000-ton allotment made to Washington. Electric furnaces apparently have been well taken care of. Few are buying scrap today. Foundries are well covered on scrap, but could use more cast although not hard pressed for it.

**NEW YORK**—The market is slow here as it has been for some time past. In fact one broker predicts that the latest optimistic reports of the progress of our army in France will lead to even further drastic restrictions of this consumer's market. Manpower shortage is strangling yard operations, even in those yards that are highly mechanized. The latter seem not to be able to sell all the open hearth melting stock they can prepare, and indicate that the lack of a differential in price between No. 1 and No. 2 causes mills to demand No. 1 and reject shipments containing No. 2 heavy melting stock. Prices are from 50c. to \$1.00 below ceilings on all grades, and turnings delivered at Conshohocken at \$12.50, \$1.25 under.

**PHILADELPHIA**—Two mills are out of the market here and one consumer is restricting incoming shipments. The Worth Steel Co. has had to discontinue its scrap receipts because of a strike which shut down the entire plant. Although placing new orders, mills are cancelling overdue orders, in order to speed up deliveries. Dealers' stockpiles are being kept at a minimum because of their fear of being caught with large inventories

should the European war suddenly end. Although springboard differentials have not been paid here for some time, some brokers are viewing the refusal of Pittsburgh consumers to pay the springboard on open hearth grades with concern because it may further depress prices in this district. Sales on open hearth grades No. 1 and No. 2 and bundles have been selling at \$1.00 under ceiling price.

**BUFFALO**—Turnings continue in demand with the principal consumer paying the ceiling price of \$14.25 on shipped-in tonnage and \$13.50 for local deliveries. Scrap movement to Buffalo via Barge Canal has passed 100,000 tons and has eased the situation here considerably. More German war scrap has been unloaded at a local yard for processing, the latest arrival consisting of 11 carloads. Demand for low phos has dropped considerably.

**CLEVELAND**—The low volume of business of the past month continues here. On the whole consumers say that scrap is easier now than it has been since the outbreak of the war. There is very little demand. Offers are not too plentiful as dealers and brokers know that demand does not warrant solicitation and cut prices are not actively being used as impetus. While turnings were reported here as under ceiling at mills last week this is believed to have been offers rather than sales. Alloys continue at far below ceiling levels but nevertheless static. Expectations of heavier scrap demand in some centers due to blast furnaces being blown out do not appear to be materializing according to reports here. Cautious buying is openly charged to the war outlook. Cut prices are expected to be asked by some consumers when they again actively enter the market.

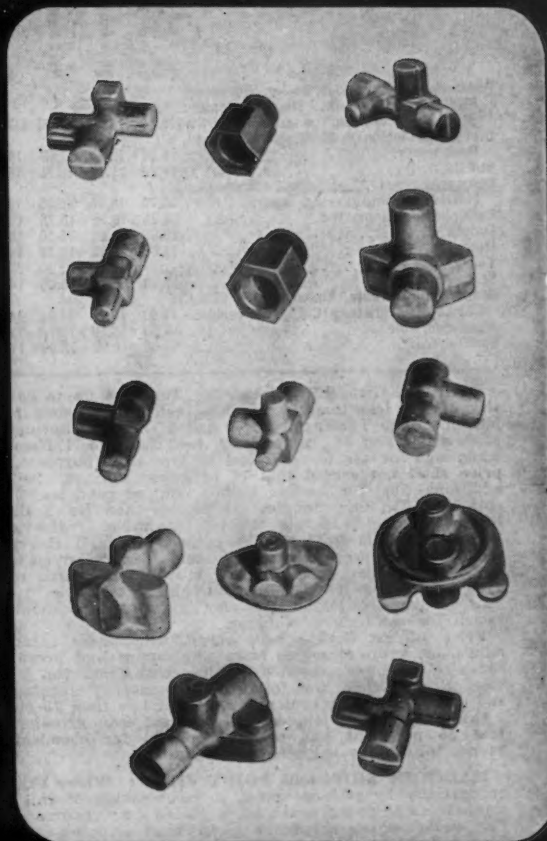
**ST. LOUIS**—Because of the heat receipts of scrap iron in the St. Louis market slowed up some during the last week. Dealers are buying more freely from shippers. Steel mills are well supplied, and are taking all material on order but making few new purchases.

**CINCINNATI**—The market continues to be very sluggish with most consumers out of the market to keep from being over-extended on inventories. Some recent cutbacks, together with rumors of reconversion, have made consumers nervous and reluctant to do additional buying, at least for a period greater than 30 days. In some instances there has been a desire to restrict inventories to less than the 30-day period. Prices, however, are still being held firmly. There has been no indication of softening of present price ceilings as yet.

**BIRMINGHAM**—The WPB is reported here to have ceased allocating railroad and dealer scrap in the south since there is little current demand in the southern area for either. Moreover, mills in the north are not willing to pay freight rates.



# A BETTER WAY IS HERE TO STAY



★ In the world of tomorrow hundreds of materials, processes and production methods developed and proven so advantageous to meet the gargantuan demands of this war, will be used extensively and most profitably in an era of peace.

Among those production methods which have been greatly used and thoroughly proven is the Press Forging at high rates of production, of ferrous and non-ferrous

hydraulic fittings where castings would formerly serve. The factors of greater production speed; superior reliability, increased strength, less waste of material cleaner surfaces, more accurate dimensions and better utilization of man power which

called for press forging of fittings for war, will be the production advantages so vital in the competitive peacetime economy to come.

WRITE FOR BULLETIN No. 75

THE  
**AJAX**  
MANUFACTURING  
COMPANY

EUCLID BRANCH P. O., CLEVELAND 17, OHIO

421 MARQUETTE BUILDING CHICAGO 3, ILLINOIS

# Prices of Iron and Steel (Other Than Railroad) Scrap, Per Gross Ton

	BASIC OPEN HEARTH AND BLAST FURNACE GRADES							ELECTRIC FURNACE, ACID OPEN HEARTH, AND FOUNDRY GRADES												
	No. 1 & 2 Heavy Melt Steel; No. 1 Bundle; No. 1 & 2 Bales; Bundled Mach. Shop. Turn.	No. 3 Bundles	No. 2 Bushellings	Shoveling Turnings	Cast Iron Borings	Machine Shop Turnings; Mixed Borings and Turnings	Mill Scale	Low Phos.		Heavy Structural and Plate			Foundry Steel			Alloy Free Turnings	Heavy Turnings	Briquetted Cast Iron Borings	Electric Furnace Bundles	
								Billet, Bloom and Forge Crops	Bar Crops, Plate Scrap; Cast Steel; Punchings and Plate Scrap	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Springs and Crankshafts					
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	\$20.00	\$18.00	\$17.50	\$17.00	\$16.00	\$15.00	\$12.00	\$25.00	\$22.50	\$21.50	\$22.00	\$22.50	\$21.50	\$22.00	\$21.00	\$20.50	\$18.00	\$19.50	\$20.00	\$21.00
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	19.50	17.50	17.00	16.50	15.50	14.50	11.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	19.50	20.50	
Buffalo	18.25	17.25	16.75	16.25	15.25	14.25	11.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	19.25	20.25	
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	16.75	16.25	15.75	14.75	13.75	10.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	18.75	19.75	
Bethlehem; Kokomo, Ind.	18.25	16.25	15.75	15.25	14.25	13.25	10.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	18.25	19.25	
Duluth	18.00	16.00	15.50	15.00	14.00	13.00	10.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	18.00	19.00	
Detroit	17.85	15.85	15.35	14.85	13.85	12.85	9.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	17.85	18.85	
Toledo	17.90	15.90	15.40	14.90	13.90	12.90	9.90	22.90	20.40	19.40	19.90	20.40	19.40	19.90	18.90	15.90	17.40	17.90	18.90	
St. Louis	17.50	15.50	15.00	14.50	13.50	12.50	9.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	17.50	18.50	
Birmingham, Atlanta, Alabama City, (Ala.), Los Angeles, Pittsburg (Cal.), San Francisco	17.00	15.00	14.50	14.00	13.00	12.00	9.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	17.00	18.00	
Minnequa, Colo.	16.50	14.50	14.00	13.50	12.50	11.50	8.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	16.50	17.50	
Seattle, Wash.	14.50	12.50	12.00	11.50	10.50	9.50	6.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	15.50	12.50	14.00	14.50	15.50	

**SPECIAL GRADES:** Briquetted Turnings up to 20 lb. with a density of not less than 60 per cent sell at the same price as Bundled Machine Shop Turnings. No. 1 and 2 Chemical Borings have a ceiling price of \$1 and \$2, respectively, less than No. 1 Heavy Melting Steel when sold for use for chemical or annealing purposes. Otherwise, the price shall not exceed that of cast iron borings. Sellers may charge additional 75c. for loading in box cars or gondolas with weatherproof covering. Tin Can Bundles are \$4 less than No. 2 Bundles. Welding Rod Butts are \$3.50 per ton less than No. 1 Heavy Melting Steel. Wrought Iron is \$6.50 per ton more than No. 1 Heavy Melting, when sold to a producer of wrought iron. Otherwise, maximum shall not exceed prices for corresponding basic open hearth or blast furnace grade. Shafting is \$7.00 per ton higher than No. 1 Heavy Melting. This includes random length shafting suitable without further preparation for rerolling or forging.

Price of Pit Scrap, ladle scrap, salamander scrap, skulls, skimmings, or scrap recovered from slag dumps and prepared to charging box size shall be computed by deducting from No. 1 Heavy Melting Steel Scrap prices the following amounts: Fe content, 85 per cent and over, \$2; 75 per cent and over, \$4; less than 75 per cent, \$8. Grindings or mill cinders (except cast iron grindings with Fe content 85 per cent and over when sold for chemical use) shall be \$4 per ton at any shipping point.

**MAXIMUM SHIPPING POINT PRICE:** Where shipment is wholly or partially by rail or vessel, or combination of rail and vessel, the scrap is at shipping point when placed f.o.b. railroad or f.a.s. vessel. For motor vehicle shipments scrap is at shipping point when loaded. Then maximum shipping point price shall be: (a) For shipping point located within a basing point, prices shown in above table for scrap at basing point in which shipping point is located, minus applicable switching charge deduction shown in paragraph labeled Switching Charges. (b) For shipping points outside basing point, price listed in above table for scrap at most favorable basing point, minus lowest charge for transportation from shipping point to such basing point by rail or water carrier or combination. When vessel movement is involved, in lieu of established dock charge or any cost customarily incurred at the dock, 75c. per ton must be included as part of deduction in computing shipping point price; 50c. at Memphis; \$1 at Great Lakes ports; and \$1.25 at New England ports. If no established trans-

portation rate exists for a portion of movement from shipping to basing point, actual charge or cost customarily incurred by shipper in such portion of movement shall be included as part of deduction in computing shipping point price. For exceptions see official order.

**SWITCHING CHARGES:** Deductions to determine the maximum shipping point prices for scrap originating in basing points are as follows (cents per gross ton): Chicago, 84c.; Pittsburgh, Brackenridge, 55c.; Detroit, 53c.; Cleveland, Johnstown, Sharon, Warren, Weirton, Youngstown, Midland, Los Angeles, San Francisco, Pittsburgh (Cal.), 42c.; Seattle, 38c.; Buffalo, Claymont, 36c.; Atlanta, Birmingham, 32c.; Ashland, Bethlehem, Butler, Canton, Cincinnati, Coatesville, Duluth, Harrisburg, Kokomo, Monessen, Phoenixville, Portsmouth, St. Louis, Steubenville, 28c.; Alabama City, 26c.; Minnequa, 22c.; Middletown, 14c.; Conshohocken, Sparrows Point, 11c.

\* For basic open hearth, blast furnace, and foundry grades, the switching charge deduction shall be 80c. per gross ton.

**UNPREPARED SCRAP:** For unprepared scrap except bundle scrap, maximum prices shall be \$3.50 per gross ton less than price of No. 1 heavy melting. That unprepared which when compressed constitutes a No. 1, 2, or 3 bundles shall be \$4.00 less than price for those prepared grades. Unprepared from which Tin Can Bundles is constituted shall be \$3.50 less than that prepared grade. Preparation-in-transit charges for such work are provided for in the order. Maximum fees for in-transit preparation of scrap that is allocated to a consumer by WPB are shown in the order, as well as exceptions.

**ALLOY CONTENT:** Premiums are allowed for specific alloy contents for the following alloys: Nickel—\$1 for each 0.25 per cent for 1 to 5.25 per cent ni.; Molybdenum—\$2 for not less than 0.15 per cent and \$3 for not less than 0.65 per cent mo.; Manganese—\$3 over No. 1 heavy melting steel price for not less than 10 per cent if scrap is in sizes larger than 12x24x8-in. \$7 over No. 1 price when not less than 10 per cent mn. and cut to sizes of 12x48x8-in. or smaller. These mn. premiums applicable only if scrap is sold for electric furnace use. Chromium—\$1 if scrap conforms to SAE 52100 and sold for electric furnace use. Multiple Alloys—Where scrap contains two premium alloys, premium charged may not exceed maximum premium for any one contained alloy.

## Tool Steel Scrap Prices (MPR 379)

SEGREGATED	Solids		Turnings		UNSEGREGATED SOLIDS	UNSEGREGATED TURNINGS
	Per Lb. Cont. W	Per Lb. Cont. W	Per Lb. Cont. W	Per Lb. Cont. W		
Type 1. 12% min. W, 1% max. Mo.	\$1.80	\$1.60			\$1.50 per lb. contained W if 5% or more.	\$1.30 per lb. contained W if 5% or more.
Type 2. 5 to 12% W, 1% max. Mo.	1.60	1.40			\$1.15 per lb. contained W if 1 to 5%.	\$1.00 per lb. contained W if 1 to 5%.
Type 3. 1 to 5% W, 1.5% max. Mo.	1.25	1.25			\$0.80 per lb. contained Mo if 1.5% or more.	\$0.70 per lb. contained Mo if 1.5% or more.
*Type 4. 7% min. Mo, 2% max. W.	0.125	0.105			If both W and Mo are within ranges, payment may be made for both W and Mo content.	
*Type 5. 3.5 to 6% Mo, 4.5 to 6% W.	0.135	0.115				

\*Per lb. of scrap material.

If segregated, a premium of \$1.50 per lb. of contained Co allowed if Co content is 3% or over. No scrap considered segregated if Co content ranges between 0.5 and 3%. If Cu or Ni content over 0.25%, price shall be reduced by 50%. If 500 lb. or less is sold, either segregated or unsegregated, price shall be reduced 2c. per lb. of scrap material.

## Cast Iron Scrap Price, Per Gross Ton

The maximum shipping point, or on-line price in the case of railroad sellers, price per gross ton for cast iron scrap shall be the price shown in the accompanying table for the zone in which the scrap is located. For railroad sellers the maximum on-line price shall be the price shown in the table for the highest priced zone in which the railroad operates.

Grades	Zone A	Zone B	Zone C
Cast Iron No. 1 (cupola cast)	\$18.00	\$19.00	\$20.00
Cast Iron No. 2 (charging box cast)	17.00	18.00	19.00
Cast Iron No. 3 (heavy breakable cast)	14.50	15.50	16.50
Cast Iron No. 4 (burnt cast)	13.25	14.25	15.25
Cast Iron Brake Shoes	13.25	14.25	15.25
Stove Plate	17.00	18.00	19.00
Clean Auto Cast	18.00	19.00	20.00
Unstripped Motor Blocks	15.50	16.50	17.50
Wheels No. 1.	18.00	19.00	20.00
Malleable	20.00	21.00	22.00

Zone A includes Mont., Idaho, Wyo., Nev., Utah, Ariz., and N. M. Zone B includes N. D., S. D., Neb., Colo., Kan., Okla., Texas, and Fla. Zone C includes all states not named in zones A and B, and includes switching district of Kansas City, Kansas-Missouri.

**DELIVERED PRICE:** For any cast grade, the delivered price shall be the shipping point price plus established charges for transportation from shipping point to point of delivery by means of transportation employed. If delivery involves water movement, dock charges incurred may be added. On privately owned docks, specified charges are listed in the order. For scrap of railroad origin, the delivered price shall be the maximum on-line price plus transportation charges allowable to railroad sellers of steel scrap. For truck deliveries, shipping point or on-line prices plus established public carrier charges, except when truck is shipper-owned, shall determine price. When truck is shipper or broker-owned, price is that shown in table plus the highest established rail carload freight rate for shipping scrap from rail siding nearest shipping point to rail siding nearest point of delivery. Springboard limitations shall be applicable to truck deliveries of all non-operating railroad or dealer and industrial scrap. Where truck delivery charges in excess of \$1 occur, they must be certified by OPA.



Hex or square...standard or special nuts...  
it's all the same to Apex!



**SIZES**— $\frac{5}{8}$ " to  $1\frac{1}{2}$ " (Universal Joint Sizes).

**SOCKETS**—Hex or double hex—square or double square ( $\frac{1}{4}$ " AF and up).

**SHANKS**—To fit any type drive (electric, air or impact).

**STYLE**—With or without tension sleeve.

**WORKING ANGLE**—35° (No binding or breaking at maximum working angle).

**HARDNESS** to your own Rockwell specifications if you like.

We're tooled up for speed and flexibility. Apex also makes Universal Socket Adapters, Universal Joints, Phillips Bits and Screw Drivers, Production Tools for drilling, tapping, reaming and stud setting. Write for Catalog 14.

THE APEX MACHINE & TOOL COMPANY  
DAYTON 2, OHIO

# APEX

## Socket Wrenches

# Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Dollars Per Base Box)				
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Dollars Per Gross Ton)				
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Dollars Per Gross Ton)				
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Per Gross Ton)				
No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	31.34
Ferromanganese‡	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.  
‡For carlots at seaboard.

Scrap:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Per Gross Ton)				
Heavy melt'g steel, P'gh	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00

Coke, Connellsville:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Per Net Ton at Oven)				
Furnace coke, prompt	\$7.00	\$7.00	\$7.00	\$6.50
Foundry coke, prompt	8.25	8.25	8.25	7.50

Non-Ferrous Metals:	Aug. 15, 1944	Aug. 8, 1944	July 11, 1944	Aug. 17, 1943
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 174-182.

## Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

FINISHED STEEL	
August 15, 1944	2.25513c. a Lb.
One week ago	2.25513c. a Lb.
One month ago	2.25513c. a Lb.
One year ago	2.26190c. a Lb.

PIG IRON	
Aug. 15, 1944	23.61 a Gross Ton
One week ago	23.61 a Gross Ton
One month ago	23.61 a Gross Ton
One year ago	23.61 a Gross Ton

SCRAP STEEL	
Aug. 15, 1944	\$19.17 a Gross Ton
One week ago	\$19.17 a Gross Ton
One month ago	\$19.17 a Gross Ton
One year ago	\$19.17 a Gross Ton

	HIGH	LOW
1943	2.25513c.	2.25513c.
1942	2.26190c.	2.26190c.
1941	2.43078c.	2.43078c.
1940	2.30467c., Jan. 2	2.24107c., Apr. 16
1939	2.35367c., Jan. 3	2.26689c., May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18
1937	2.58414c., Mar. 9	2.32263c., Jan. 4
1936	2.32263c., Dec. 28	2.05200c., Mar. 10
1935	2.07642c., Oct. 1	2.06492c., Jan. 8
1934	2.15367c., Apr. 24	1.95757c., Jan. 2
1933	1.95578c., Oct. 3	1.75836c., May 2
1932	1.89196c., July 5	1.83901c., Mar. 1
1931	1.99626c., Jan. 13	1.86586c., Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1943	\$23.61	\$23.61
1942	23.61	23.61
1941	\$23.61, Mar. 20	\$23.45, Jan. 2
1940	23.45, Dec. 23	22.61, Jan. 2
1939	22.61, Sept. 19	20.61, Sept. 12
1938	23.25, June 21	19.61, July 6
1937	23.25, Mar. 9	20.25, Feb. 16
1936	19.74, Nov. 24	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71, May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	HIGH	LOW
1943	\$19.17	\$19.17
1942	19.17	19.17
1941	\$22.00, Jan. 7	\$19.17, Apr. 10
1940	21.83, Dec. 30	16.04, Apr. 9
1939	22.50, Oct. 3	14.08, May 16
1938	15.00, Nov. 22	11.00, June 7
1937	21.92, Mar. 30	12.67, June 8
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, Apr. 29
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



# Correct Lubrication

## MEANS BETTER MAINTENANCE



• Very often, *correct* lubrication is the remedy for difficult maintenance due to excessive wear.

Sinclair provides *correct* lubrication for **MACHINING EQUIPMENT** of all types with a range of specialized oils and

greases that permit a reduced inventory of lubricants... also Cutting Oils and Coolants adapted to every individual problem.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

## SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

THE IRON AGE, August 17, 1944—173

# Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire.

Basing Point Product	DELIVERED TO												
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Provo, Utah	10 Pacific Ports, Cars
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢			2.65¢
Cold Rolled Sheets <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢			3.70¢
Galv. Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢			4.05¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢			4.00¢
Long Ternes <sup>2</sup>	3.80¢	3.80¢	3.80¢										4.55¢
Hot Rolled Strip <sup>3</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢			2.75¢
Cold Rolled Strip <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester=3.00¢)				2.90¢
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢						
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢		(Worcester=3.35¢)				3.05¢
Coke Tin Plate, Base Box	\$5.00	\$5.00	\$5.00						\$5.10				
.50 Electro Tin Plate, Box	\$4.50	\$4.50	\$4.50						\$4.60				
.75	\$4.65		\$4.65						\$4.75				
Black Plate (29 gage) <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢				4.05¢ <sup>12</sup>
Mfg. Ternes, Special Box	\$4.30	\$4.30	\$4.30						\$4.40				
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth=2.25¢)	2.50¢			2.80¢
Rail Steel Bars <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢			2.80¢
Reinforcing (Billet) Bars <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢			2.55¢ <sup>13</sup>
Reinforcing (Rail) Bars <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢			c2.55¢ <sup>13</sup>
Cold Finished Bars <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit=2.70¢)			(Toledo=2.80¢)	2.99¢
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton=2.70¢)				2.80¢
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢		(Coatesville and Claymont=2.10¢)	2.45¢	2.60¢		2.65¢
Floor Plates	3.35¢	3.35¢							2.10¢	2.35¢			4.00¢
Alloy Plates	3.50¢	3.50¢							(Coatesville=3.50¢)		3.95¢		4.15¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem=2.10¢)	2.45¢			2.75¢
SPRING STEEL, C-R													
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester=3.00¢)				
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester=4.50¢)				
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester=6.35¢)				
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester=8.55¢)				
Bright Wire <sup>14</sup>	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester=2.70¢)	(Duluth=2.65¢)			3.10¢
Galvanized Wire													
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester=3.30¢)				3.70¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢							2.95¢

EXCEPTIONS TO PRICE SCHED. NO. 6  
Slabs—Andrews Steel Co. \$41 basing pts.;  
Wheeling Steel Corp. \$34 Portsmouth,  
Ohio; Empire Sheet & Tin Plate Corp.  
\$41; Phoenix Iron Co. (rerolling) \$41,  
(forging) \$47; Granite City Steel \$47.50.  
Blooms—Phoenix Iron Co. (rerolling) \$41,  
(forging) \$47; Pgh. Steel Co. (reroll)  
\$38.25, (forging) \$44.25.

Sheet Bar—Empire Sheet & Tin Plate Co.  
\$39 mill; Wheeling Steel Corp. \$38 Ports-  
mouth, Ohio.

Billets, Forging—Andrews Steel Co. \$50  
basing pts.; Follansbee Steel Corp. \$49.50  
Toronto; Phoenix Iron Co. \$47.00 mill.  
Geneva Steel Co. \$64.64 f.o.b. Pacific Coast;  
Pittsburgh Steel Co. \$49.50.

Billets, Rerolling—Continental Steel Corp.  
may charge Acme Steel in Chicago switch-  
ing area \$34 plus freight from Kokomo,  
Ind.; Northwestern Steel & Wire Co.  
(Lend-Lease) \$41 mill; Wheeling Steel  
Corp. (small) \$36 Portsmouth, Ohio;  
(blooming mill sizes) applicable base,  
f.o.b. Portsmouth, Ohio; Stanley Works  
may sell Washburn Wire Co. under allo-  
cation at \$39 Bridgeport, Conn.; Key-  
stone Steel & Wire Co. may sell Acme  
Steel Co. at Chicago base, f.o.b. Peoria;  
Phoenix Iron Co. \$41 mill; Continental  
Steel Corp. (1½ x 1½) \$39.50, (2 x 2)  
\$40.60 Kokomo, Ind. (these prices include  
\$1 size extra); Keystone Steel & Wire  
Co. \$36.40 Peoria; Connors Steel Co.  
\$50.69 Birmingham; Ford Motor Co. \$34  
Dearborn, Mich. Geneva Steel Co. \$58.64  
f.o.b. Pac. C. Pgh. Steel Co. \$43.50.

Structural Shapes—Phoenix Iron Co. \$2.35  
basing pts. (export) \$2.50 Phoenixville;

Knoxville Iron Co. \$2.30 basing points.

Bar Size Shapes—(Angles) W. Ames &  
Co., 10 tons or over, \$3.10 mill.

Rails—Sweet Steel Co. (rail steel) \$50  
mill; West Virginia Rail Co. (lightweight)

on allocation based Huntington, W. Va.;  
Colorado Fuel & Iron Corp., \$45 Pueblo.

Hot Rolled Plate—Granite City Steel Co.  
\$2.65 mill; Knoxville Iron Co. \$2.25 bas-  
ing pts.; Kaiser Co. and Geneva Steel Co.

\$3.20 Pacific Ports; Central Iron & Steel  
Co. \$2.50 basing points; Granite City Steel  
Co. \$2.35 Granite City.

Merchant Bars—W. Ames Co., 10 tons  
and over, \$2.85 mill; Eckels-Nye Steel  
Corp., \$2.50 basing pts. (rail steel) \$2.40;

Phoenix Iron Co. \$2.40 basing pts.; Sweet  
Steel Co. (rail steel) \$2.35 mill; Joslyn  
Mfg. & Supply Co., \$2.35 Chicago; Calu-

met Steel Div., Borg Warner Corp. (8 in.  
mill bars) \$2.35 Chicago; Knoxville Iron  
Co. \$2.30 basing pts. Laclede Steel Co.,

sales to LaSalle Steel granted Chicago  
base, f.o.b. Madison, Ill. Milton Mfg. Co.  
\$2.75 f.o.b. Milton, Pa.

Logan Iron and Steel Co., Burnham, Pa.,  
wrought iron bars, Grade I, \$7.90 per  
100 lb. f.o.b. plant. Ceiling is \$7.40 per  
100 lb.

Reinforcing Bars—W. Ames & Co., 10  
tons and over, \$2.85 mill; Sweet Steel Co.  
(rail steel) \$2.35 mill; Columbia Steel Co.  
\$2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn  
Steel Co. on allocation, Pittsburgh c.f.  
base plus c/l freight on hot rolled bars

Pittsburgh to Spring City, Pa.; New Eng-  
land Drawn Steel Co. on allocation out-  
side New England, Buffalo c.f. base plus

c/l freight Buffalo to Massfield, Mass.,  
f.o.b. Massfield; Empire Finished Steel  
Corp. on allocation outside New England,  
Buffalo c.f. base plus c/l freight Buffalo  
to plants f.o.b. plant; Compressed Steel  
Shafting Co. on allocation outside New  
England, Buffalo base plus c/l freight  
Buffalo to Readville, Mass. f.o.b. Read-  
ville; Medart Co. in certain areas, Chi-  
cago c.f. base plus c/l freight Chicago to  
St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery  
except Texas and Okla. Chicago, base,  
f.o.b. Fort Worth, Tex.; Connors Steel Co.  
shipped outside Ala., Mississippi, Louisi-  
ana, Georgia, Florida, Tenn., Pittsburgh  
base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply  
Co. \$2.30 Chicago; Knoxville Iron Co.  
\$2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co.,  
Middletown base on shipments to Detroit  
or area; Parkersburg Iron & Steel Co.,  
\$2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co.,  
\$3.75 basing pts.; Parkersburg Iron &  
Steel Co. \$3.85 Parkersburg; Apollo Steel  
Co. \$3.75 basing pts.; Continental Steel  
Co., Middletown base on Kokomo, Ind.,  
product; Superior Sheet Steel Co., Pitts-  
burgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co.  
when priced at Pittsburgh, freight to Gulf  
Coast and Pacific Ports may be charged  
from Chester, Pa., also to points lying  
west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate  
Co., maximum base price mill is \$2.45 per  
100 lb., with differentials, transportation  
charges, etc., provided in RPS. No. 6.

f.o.b. Massfield; Empire Finished Steel  
Corp. on allocation outside New England,  
Buffalo c.f. base plus c/l freight Buffalo  
to plants f.o.b. plant; Compressed Steel  
Shafting Co. on allocation outside New  
England, Buffalo base plus c/l freight  
Buffalo to Readville, Mass. f.o.b. Read-  
ville; Medart Co. in certain areas, Chi-  
cago c.f. base plus c/l freight Chicago to  
St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery  
except Texas and Okla. Chicago, base,  
f.o.b. Fort Worth, Tex.; Connors Steel Co.  
shipped outside Ala., Mississippi, Louisi-  
ana, Georgia, Florida, Tenn., Pittsburgh  
base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply  
Co. \$2.30 Chicago; Knoxville Iron Co.  
\$2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co.,  
Middletown base on shipments to Detroit  
or area; Parkersburg Iron & Steel Co.,  
\$2.25 Parkersburg.

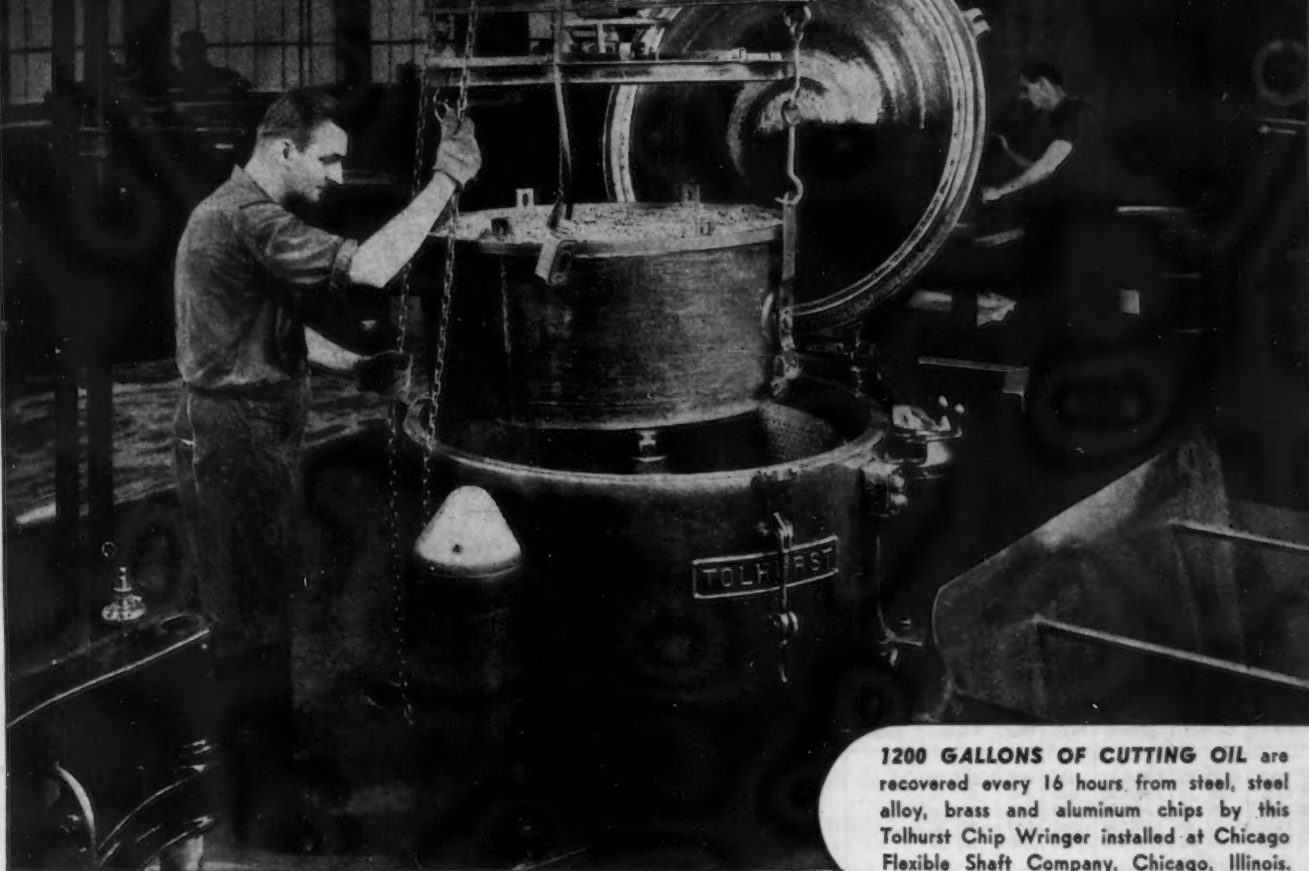
Galvanized Sheets—Andrews Steel Co.,  
\$3.75 basing pts.; Parkersburg Iron &  
Steel Co. \$3.85 Parkersburg; Apollo Steel  
Co. \$3.75 basing pts.; Continental Steel  
Co., Middletown base on Kokomo, Ind.,  
product; Superior Sheet Steel Co., Pitts-  
burgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co.  
when priced at Pittsburgh, freight to Gulf  
Coast and Pacific Ports may be charged  
from Chester, Pa., also to points lying  
west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate  
Co., maximum base price mill is \$2.45 per  
100 lb., with differentials, transportation  
charges, etc., provided in RPS. No. 6.



# SAVE valuable... CUTTING OIL



1200 GALLONS OF CUTTING OIL are recovered every 16 hours from steel, steel alloy, brass and aluminum chips by this Tolhurst Chip Wringer installed at Chicago Flexible Shaft Company, Chicago, Illinois.

**TOLHURST CHIP WRINGERS** recover up to 98.6% of valuable cutting oil from metal chips, through the application of *centrifugal force* only. The routine is very simple and unskilled help can efficiently operate Tolhurst Chip Wringers.

**REDUCE TOOL WEAR** A plentiful daily supply of fresh, reclaimed oil encourages a more conscientious use of cutting oil. Tool room records show reductions in tool wear run as much as 50% after installing Tolhurst equipment. Frequent collection and processing of chips result in cleaner floors and reduce the hazard of fire. Investigate Tolhurst Chip Wringers for conserving cutting oil — reducing tool wear. Details gladly sent upon request.



## TOLHURST CHIP WRINGERS

TOLHURST CENTRIFUGAL DIVISION • American Machine and Metals, Inc., East Moline, Illinois

"Since 1852 — CENTRIFUGAL MAKERS FOR THE PROCESS INDUSTRIES"

# PRICES

## WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendments to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 9617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 9617-20	Cold Drawn, NE 9442-45 Ann.
Philadelphia	3.518	4.372 <sup>a</sup>	5.018 <sup>a</sup>	3.922	4.772	3.605	3.668	3.822	4.072	5.966	7.068	7.272	8.322
New York	3.590	4.613 <sup>a</sup>	5.010	3.974 <sup>a</sup>	4.772	3.768	3.758	3.853	4.103	5.008	7.108	7.303	8.383
Boston	3.744	4.744 <sup>a</sup>	5.224 <sup>a</sup>	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.762	3.594	3.758	3.802	4.082				
Norfolk	3.771	4.965	5.371	4.185	4.865	3.971	4.002	4.085	4.165				
Chicago	3.25	4.20	5.231	3.60	4.651 <sup>7</sup>	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337 <sup>a</sup>	5.272 <sup>a</sup>	3.737	4.767 <sup>17</sup>	3.887	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877 <sup>a</sup>	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.75 <sup>a</sup>	3.619	4.669	3.63	3.49	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00 <sup>a</sup>	3.70	4.659 <sup>17</sup>	3.899	3.661	3.48	3.80	6.08	7.18	7.18	8.208
Cincinnati	3.425	4.475 <sup>a</sup>	4.825 <sup>a</sup>	3.675	4.711	3.811	3.691	3.611	4.011				
St. Louis	3.397	4.347 <sup>a</sup>	5.172 <sup>a</sup>	3.747	4.931 <sup>17</sup>	3.897	3.687	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.48	5.257 <sup>a</sup>	3.86	4.351 <sup>7</sup>	3.811 <sup>a</sup>	3.811 <sup>a</sup>	3.761 <sup>a</sup>	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608 <sup>a</sup>	4.215		4.185	4.168	4.115	4.43				
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	6.08	7.18	7.18	8.23
Birmingham	3.45		4.75	3.70		3.55	3.55	3.50	4.43				
Memphis	3.965 <sup>7</sup>	4.68	3.265	4.215		4.065	4.065	4.015	4.33				
New Orleans	4.058 <sup>a</sup>	4.95	5.358	4.308		4.158	4.158 <sup>a</sup>	4.108 <sup>a</sup>	4.629				
Houston	3.763	5.573	6.313 <sup>a</sup>	4.313		4.25	4.25	3.75	5.373 <sup>a</sup>	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20 <sup>a</sup>	8.10 <sup>a</sup>	4.95	5.813 <sup>a</sup>	4.95	4.95	4.40	5.563	8.364	9.464	9.464	10.464
San Francisco	4.551 <sup>a</sup>	7.30 <sup>a</sup>	8.35 <sup>a</sup>	4.501 <sup>a</sup>	7.333 <sup>17</sup>	4.651 <sup>a</sup>	4.351 <sup>a</sup>	4.151 <sup>a</sup>	5.333	8.304	9.404	9.404	10.404
Seattle	4.651 <sup>a</sup>	7.05 <sup>a</sup>	8.95 <sup>a</sup>	4.251 <sup>a</sup>		4.751 <sup>a</sup>	4.451 <sup>a</sup>	4.251 <sup>a</sup>	5.753				
Portland	4.651 <sup>a</sup>	8.60 <sup>a</sup>	5.75 <sup>a</sup>	4.751 <sup>a</sup>		4.751 <sup>a</sup>	4.451 <sup>a</sup>	4.451 <sup>a</sup>	5.553	8.304	9.404	9.404	9.404
Salt Lake City	4.531 <sup>7</sup>		6.171 <sup>a</sup>	5.531 <sup>7</sup>		4.961 <sup>7</sup>	4.961 <sup>7</sup>	4.861 <sup>7</sup>	5.90				

## NATIONAL EMERGENCY (N. E.) STEELS (Hot Rolled Mill Extras for Alloy Content)

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar-Strip	Billets, Blooms and Slabs	Bars and Bar-Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	\$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25c	\$25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.65	13.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.70	14.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40	8.00		
NE 9260	.55/ .65	.70/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9261	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.10/ .25			.65	13.00		
NE 9262	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.25/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9425	.23/ .28	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9449	.38/ .43	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9545*	.43/ .48	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00

<sup>a</sup>Recommended for large sections only. Note: The extras shown are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

## Base Quantities

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 160 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over. (\* Philadelphia: Galvanized sheets, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

\*Add 0.271c. for sizes not rolled in Birmingham.

\*City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports\*)

Per Gross Ton  
Old range, bessemer, 51.50 ..... \$4.75  
Old range, non-bessemer, 51.50 ..... 4.60  
Mesaba, bessemer, 51.50 ..... 4.60  
Mesaba, non-bessemer, 51.50 ..... 4.45  
High phosphorus, 51.50 ..... 4.35  
\*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

## FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

## Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Base price per short ton  
Effective CaF<sub>2</sub> Content:  
70% or more ..... \$33.00  
65% but less than 70% ..... 32.00  
60% but less than 65% ..... 31.00  
Less than 60% ..... 30.00



## PRICES

### SEMI-FINISHED STEEL

#### Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill... \$31.00  
*Exceptions:* Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., \$34.25. Pgh. Steel Co. \$33.10.

#### Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown... \$36.00  
*Exceptions:* Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports. Pgh. Steel Co. \$33.10.

#### Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh... \$45.00  
*Exceptions:* C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

#### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$13 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

*Per Gross Ton*

Rerolling... \$34.00  
 Forging quality... 40.00  
 For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

#### Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton... 54.00  
 Price delivered Detroit \$2.00 higher; E. Michigan \$3.00 higher.

#### Shell Steel

*Per Gross Ton*

3 in. to 12 in... \$52.00  
 12 in. to 18 in... 54.00  
 18 in. and over... 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

#### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

*Per Gross Ton*

Open hearth or bessemer... \$34.00

#### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

*Per Lb.*

Grooved, universal and sheared... 1.50c.

#### Wire Rods

(No. 5 to 9/32 in.)

*Per Lb.*

Pittsburgh, Chicago, Cleveland... 2.00c.

Worcester, Mass... 2.10c.

Birmingham... 2.00c.

San Francisco... 2.50c.

Galveston... 2.35c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

### TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

*Base per lb.*

High speed... 67c.

Straight molybdenum... 54c.

Tungsten-molybdenum... 57 1/2 c.

High-carbon-chromium... 43c.

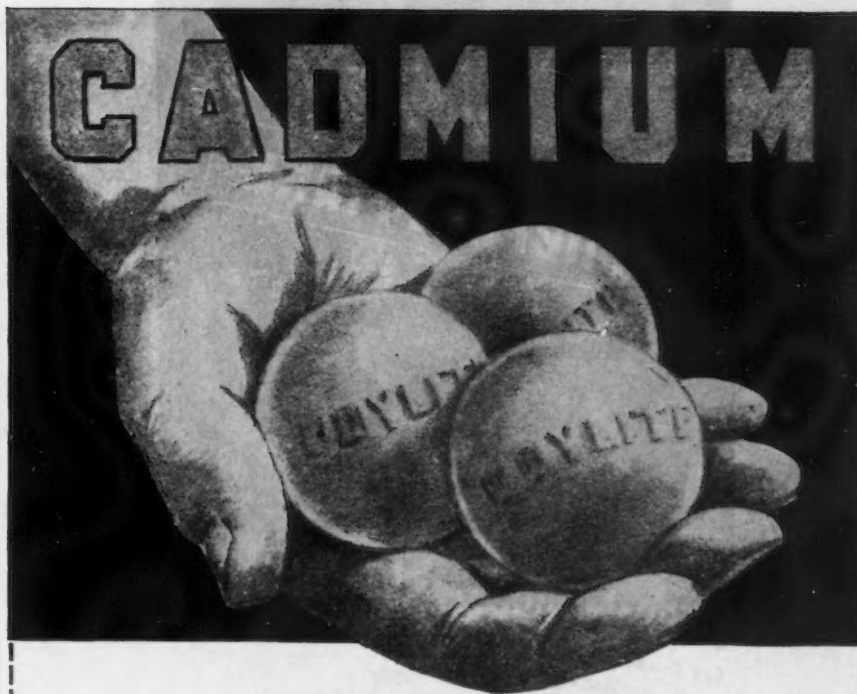
Oil hardening... 24c.

Special carbon... 22c.

Extra carbon... 18c.

Regular carbon... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.



## BY UDYLITE...

Since the introduction of Cadmium as a metal protecting coating, the Udylite Corporation has been its foremost advocate and pioneer.

Cadmium is a "natural" protective coating, inert to the ravages of the elements, highly ductile, resistant to abrasion and wear, and last but not least, beautiful to look at as well.

Of course Cadmium is worthless without the knowledge and experience necessary for its successful application.

Udylite has that "know how" gained through years of pioneering its use and thousands of dollars spent in developing better, and still better equipment and processes for its application.

CADMIUM BY UDYLITE is an eye-appealing protective coating warranting your investigation.

Our years of experience and experimentation are a plus value which costs you nothing.

## THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit 11, Mich.

Chicago 12  
1943 Walnut Street


Long Island City 1, N. Y.  
11-16 44th Drive

Cleveland 3  
4408 Carnegie Ave.

New Open Hearth Furnaces  
at 8 LARGE PLANTS

*are Insulated with*

**Therm-O-Flake**



## SPECIFICATIONS

for Greater Fuel Economy  
Improved Working Conditions

Therm-O-Flake Coating Vertical walls — bulkheads —  
roofs — arches.

Therm-O-Flake Brick Flue Walls and Arch — Checker  
Chamber Walls. Slag Pocket Walls.

Therm-O-Flake Concrete Flue — Checker Chamber  
Hearth Bottoms.



JOLIET, ILL.

## High Temperature INSULATION

## RELIABILITY under tough operating conditions ---

The efficient and sturdy Roots-Connersville Positive Displacement design stands up well under severe operating conditions in all foundries. Long life and dependable performance of "R-C" Blowers on really tough jobs have made them the preferred choice of experienced foundrymen everywhere. Write for literature.

### ROOTS-CONNERSVILLE BLOWER CORP.

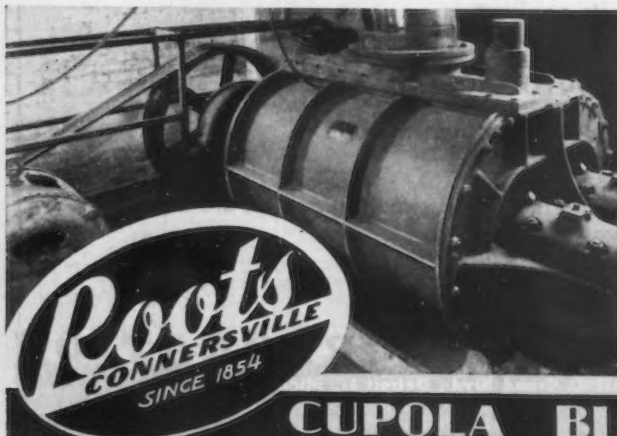
408 Ohio Ave., Connersville, Ind.

Roots-Connersville Cupola Blower installed in a mid-western foundry. Capacity 2700 c.f.m., 484 r.p.m., 20 oz. pressure.



### POSITIVE DISPLACEMENT

Twin impellers alternately suck in, momentarily entrap, and then expel definitely known amounts of air, resulting in positive delivery of four equal volumes each revolution of drive shaft. Impellers need no seal or lubrication. Capacity varies with speed. Pressure automatically builds up to overcome resistance on discharge side.



## CUPOLA BLOWERS

## PRICES

### WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District  
and Lorain, Ohio, Mills  
(F.o.b. Pittsburgh only on wrought pipe)  
Base Price—\$200.00 per Net Ton

#### Steel (Butt Weld)

	Black	Galv.
1/2 in. ....	63 1/2	51
3/4 in. ....	66 1/2	55
1 to 3 in. ....	68 1/2	57 1/2

#### Wrought Iron (Butt Weld)

1/2 in. ....	24	3 1/2
3/4 in. ....	30	10
1 and 1 1/4 in. ....	34	16
1 1/2 in. ....	38	18 1/2
2 in. ....	37 1/2	18

#### Steel (Lap Weld)

2 in. ....	61	49 1/2
2 1/2 and 3 in. ....	64	52 1/2
3 1/2 to 6 in. ....	66	54 1/2

#### Wrought Iron (Lap Weld)

2 in. ....	30 1/2	12
2 1/2 to 3 1/2 in. ....	31 1/2	14 1/2
4 in. ....	33 1/2	18
4 1/2 to 8 in. ....	32 1/2	17

#### Steel (Butt, extra strong, plain ends)

1/2 in. ....	61 1/2	50 1/2
3/4 in. ....	65 1/2	54 1/2
1 to 3 in. ....	67	57

#### Wrought Iron (Same as Above)

1/2 in. ....	25	6
3/4 in. ....	31	12
1 to 2 in. ....	33	19 1/2

#### Steel (Lap, extra strong, plain ends)

2 in. ....	59	48 1/2
2 1/2 and 3 in. ....	63	52 1/2
3 1/2 to 6 in. ....	66 1/2	56

#### Wrought Iron (Same as Above)

2 in. ....	33 1/2	15 1/2
2 1/2 to 4 in. ....	39	22 1/2
4 1/2 to 6 in. ....	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

### CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago....	\$54.80
6-in. and larger, del'd New York....	52.20
6-in. and larger, Birmingham....	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles....	69.40
6-in. and larger f.o.b. cars, Seattle. 71.20	
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

### BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld,
	Cold	Hot
	Drawn	Hot
	Roiled	Roiled
2 in. o.d. 13 B.W.G. 15.03	13.04	12.33
2 1/2 in. o.d. 12 B.W.G. 20.21	17.54	16.53
3 in. o.d. 12 B.W.G. 22.48	19.50	18.35
3 1/2 in. o.d. 11 B.W.G. 23.37	24.62	23.15
4 in. o.d. 10 B.W.G. 35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft., and over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft. 5%	
20,000 lb. or ft. to 29,999 lb. or ft. 10%	
10,000 lb. or ft. to 19,999 lb. or ft. 20%	
5,000 lb. or ft. to 9,999 lb. or ft. 30%	
2,000 lb. or ft. to 4,999 lb. or ft. 45%	
Under 2,000 lb. or ft.....	65%



## PRICES

### WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points
Standard wire nails.....	\$2.55	\$3.05
Coated nails .....	2.55	3.05
Cut nails, carloads .....	3.35	...
Base per 100 Lb.		
Annealed fence wire ....	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
Base Column		
Woven wire fence* ....	\$0.67	\$0.85
Fence posts, carloads ...	.69	.86
Single loop bale ties ...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbed wire ..	.70	...

\*15 1/2 gage and heavier. \*\*On 30-rod spools in carload quantities.  
†Prices subject to switching or transportation charges.

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

#### Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
1/2 in. & smaller x 6 in. & shorter.....	65 1/2
9/16 & 5/8 in. x 6 in. & shorter.....	63 1/2
3/4 to 1 in. x 6 in. & shorter .....	61
1 1/2 in. and larger, all lengths .....	59
All diameters over 6 in. long.....	59
Lag, all sizes .....	62
Plow bolts .....	65

#### Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

1/2 in. and smaller .....	62
9/16 to 1 in. inclusive.....	59
1 1/4 to 1 1/2 in. inclusive.....	57
1 1/2 in. and larger .....	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

#### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller .....	64
1/2 in. and smaller .....	62
1/2 in. through 1 in.....	60
9/16 in. to 1 in.....	59
1 1/4 in. through 1 1/2 in.....	57
1 1/2 in. and larger .....	56

In full keg lots, 10 per cent additional discount.

#### Stove Bolts

Consumer

Packages, nuts loose .....	71 and 10
In packages, with nuts attached .....	71
In bulk .....	80
On stove bolts freight allowed up to 65c per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.	

#### Large Rivets

(1/2 in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....	\$3.75
---	--------

#### Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....	65 and 5
---	----------

#### Cap and Set Screws

Consumer

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.....	64
Upset set screws, cup and oval points	71
Milled studs .....	46
Flat head cap screws, listed sizes .....	36
Fillister head cap, listed sizes .....	51
Freight allowed up to 65c per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C. ....	\$6.00	\$12.00
15-lb. coating I.C. ....	7.00	14.00
20-lb. coating I.C. ....	7.50	15.00

# “99”

just one year shy of  
a century of springmaking...and believe us,  
we've seen a lot of life...panics...wars...boom  
times...bum times...but we believe in our  
country and our cause...and we stick to  
our knitting because we want to be

“Everybody's Spring Dept.”



## DUNBAR

BROTHERS CO.

DIV. OF ASSOCIATED SPRING CORP.

BRISTOL, CONN.

SPRINGS • WIRE FORMS • SMALL STAMPINGS

## PRECISION WORK ON SMALL PARTS

(up to 20 lbs.)

Induction heat-treating (30 KW)

External Grinding (up to 10" x 36")

Internal Grinding

Surface Grinding (plain and rotary)

Milling—vertical, horizontal, contour

Duplicating

Automatic lathe work

Etc.

For list of equipment, pictures and other information concerning plant write

## GENERAL REFINERIES, INC.

27 NORTH 4TH STREET, MINNEAPOLIS 1, MINNESOTA

# PRICES

## PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations on gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00		
Brooklyn	27.50	27.00		28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia, (4)	25.84	25.34	26.84	26.34	\$30.74	
Bethlehem, Pa.	25.00	24.50	26.00	25.50		
Everett, Mass.	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.	25.00	24.50	26.00	25.50	29.50	
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50	26.00	25.50		
Erie, Pa.	24.00	23.50	24.50	24.00		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpsville, Pa. (1)	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati, Ohio	25.11	24.61		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39	32.89	
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.86	
St. Louis	24.50	24.50				
Chicago	24.00	23.50	24.50	24.00	35.46	\$37.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00	32.42	
Hamilton, Ohio	24.00	23.50	24.50	24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown	24.00	23.50	24.50	24.00	32.42	
Detroit	24.00	23.50	24.50	24.00		
Lake Superior Fe.						34.00
Lytle, Tenn. Fe. (2)						33.00
St. Paul	26.63	26.13	27.13	26.63	39.80	
Duluth	24.50	24.00	25.00	24.50		
Birmingham	20.38	19.00	20.00			
Los Angeles	26.95					
San Francisco	26.95					
Seattle	26.95					
Provo, Utah	22.00	21.50				
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace ..... \$23.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for \$28.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa. permitted to charge \$1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$1.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differential (not to exceed 50c. a ton for each 0.15 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$3 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

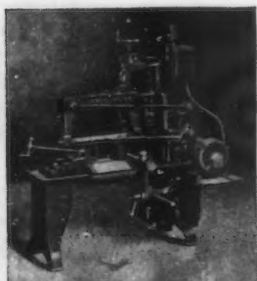
Copper, electrolytic, 150 and 200 mesh	21 1/2 to 23 1/2 c.
Copper, reduced, 150 and 200 mesh	20 1/2 to 25 1/2 c.
Iron, commercial, 100 and 200 mesh, 96 + % Fe	13 1/2 to 15 c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4 c.
Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots	62 c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 32 c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42 c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90 c.
Aluminum, 100 and 200 mesh	23 to 27 c.
Antimony, 100 mesh	20.6 c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.03
Lead, 100, 200 & 300 mesh, 11 1/2 to 12 1/2 c.	
Manganese, 150 mesh	51 c.
Nickel, 150 mesh	51 1/2 c.
Solder powder, 100 mesh, 8 1/2 c. plus metal	
Tin, 100 mesh	58 1/2 c.
Tungsten metal powder, 98%	
99%, any quantity, per lb.	\$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	\$2.60
Under 100 lb.	\$3.00

\*Freight allowed east of Mississippi.

## COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.38
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

\*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges. \*\*Mo., Ala. and Tenn. producers—\$13.35.



**Best!**  
**FOR LIGHT DUTY**  
**Speed!**

**High Speed at Low Cost**  
**No. 4B**

For tool room, stock room, or maintenance shop, this 6" x 6" capacity hack saw is superior to anything in its price class. It embodies features of MARVEL Heavy Duty production saws. Cuts a 2" standard pipe in 30 seconds—a 3" round in 3 minutes!

**MARVEL SAWS**

**2-Speed and 4-Speed**

For applications where materials of different hardnesses to be cut, MARVEL 4B is available in 2-Speed and 4-Speed models. Built-in work tracks for holding outer end of bars are also available for all models.

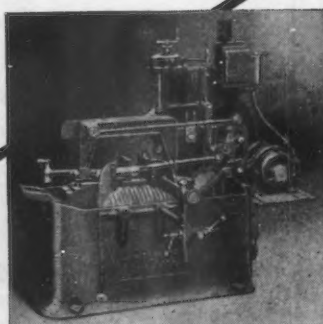
### Complete Range of

### Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course.)

**ARMSTRONG-BLUM MFG. CO.**

5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.





## PRICES

### REFRACTORIES

(F.o.b. Works)

Fire Clay Brick		Per 1000
Super-duty brick, St. Louis	.....	\$64.60
First quality, Pa., Md., Ky., Mo., Ill.	.....	51.30
First quality, New Jersey	.....	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	.....	46.55
Second quality, New Jersey	.....	51.00
No. 1, Ohio	.....	43.00
Ground fire clay, net ton	.....	7.60

Silica Brick		Per 1000
Pennsylvania and Birmingham	.....	\$51.30
Chicago District	.....	58.90
Silica cement, net ton (Eastern)	.....	9.00

Chrome Brick		Per Net Ton
Standard chemically bonded, Balt.,	.....	
Plymouth Meeting, Chester	.....	\$54.00

Magnesite Brick		Per Net Ton
Standard, Balt. and Chester	.....	\$76.00
Chemically bonded, Baltimore	.....	65.00

Grain Magnesite		Per Net Ton
Domestic, f.o.b. Balt. and Chester	.....	
In sacks (carloads)	.....	\$43.48
Domestic, f.o.b. Chewelah, Wash.	.....	
(In bulk)	.....	22.00

### RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.,	
No. 1 O.H., gross ton	.....\$40.00
Angle splice bars, 100 lb.	.....2.70
(F.o.b. Basing Points)	Per Gross Ton
Light rails (from billets)	.....\$40.00
Light rails (from rail steel)	.....39.00

		Base per Lb.
Cut spikes	.....	3.00c.
Screw spikes	.....	5.15c.
Tie plates, steel	.....	2.15c.
Tie plates, Pacific Coast	.....	2.30c.
Track bolts	.....	4.75c.
Track bolts, heat treated, to rail-	.....	5.00c.
roads	.....	
Track bolts, jobbers discount	.....	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

### CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys		No. 304	No. 302
Forging billets	.....	21.25c.	20.40c.
Bars	.....	25.00c.	24.00c.
Plates	.....	29.00c.	27.00c.
Structural shapes	.....	25.00c.	24.00c.
Sheets	.....	36.00c.	34.00c.
Hot rolled strip	.....	23.50c.	21.50c.
Cold rolled strip	.....	30.00c.	28.00c.
Drawn wire	.....	25.00c.	24.00c.

Straight-Chromium Alloys		No. 410	No. 430	No. 442	No. 446
F.Billets	.....	15.725c.	16.15c.	19.125c.	23.375c.
Bars	.....	18.50c.	19.00c.	22.50c.	27.50c.
Plates	.....	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	.....	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	.....	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	.....	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)		No. 304
Plates	.....	18.00c.*
Sheets	.....	19.00c.
*Includes annealing and pickling.		

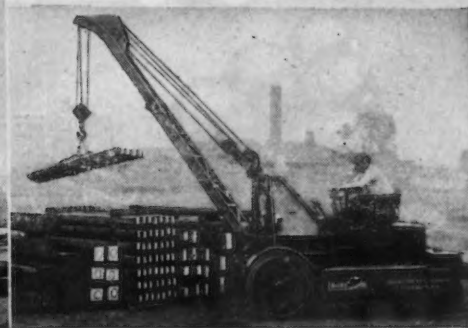
### ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

		Per Lb.
Field grade	.....	3.20c.
Armature	.....	3.55c.
Electrical	.....	4.05c.
Motor	.....	4.95c.
Dynamo	.....	5.65c.
Transformer 72	.....	6.15c.
Transformer 65	.....	7.15c.
Transformer 58	.....	7.65c.
Transformer 52	.....	8.45c.
F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.		

## HOW TO HANDLE STEEL

*Faster*



Move a KRANE KAR up to a pile of forgings, bars, blooms, billets, ingots, castings (or a scrap heap when equipped with an electric magnet), and top the boom with the full load. Transport load forward or backward and position it on either side in places inaccessible to a rigid boom crane. Make speed with the all-around safety features—stability without outriggers or jacks, automatic braking of load and boom, easy steering, and utter simplicity of operation. KRANE KAR is so easy to handle, women become expert operators in a week! Write for catalog.

USERS: Carnegie-Illinois; Bethlehem; Republic; General Motors; Consolidated; American Smelting & Refining; Lima Locomotive Wks.; etc.



THE ORIGINAL SWING BOOM MOBILE CRANE  
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

**KRANE KAR**

SILENT HOIST & CRANE CO., 851 63RD ST., BROOKLYN 20, N.Y.

## RESOURCEFULNESS... for Immediate Shipment

MASTERY of techniques in welding Navy and Army vessels—Large scale precision fabrication of railway bridge units for Army Engineers—Construction of numerous distinguished war industry plants—An enviable 42-year record of practical engineering service to the building industry—Resourcefulness sharpened by solving unusual war production problems: All these are qualifications you'll find useful—for your immediate needs or in your planning for tomorrow.


Photo: Assembling stern section of Navy Tank Landing Craft.

**MISSISSIPPI VALLEY STRUCTURAL STEEL CO.**

Engineers and Fabricators

MELROSE PARK, ILLINOIS • DECATUR, ILLINOIS • ST. LOUIS, MISSOURI

ROLL ON **ABBOTT**



*Bearing*

**BALLS**

**LOADS... LOADS... LOADS...**

ABBOTT BEARING BALLS are called upon to carry all kinds and weights of loads. Producers of war-time essentials appreciate ABBOTT uniform quality and stamina. As they plan ahead, these companies will demand the same reliability which results from specifying "ABBOTT".



**THE ABBOTT BALL COMPANY**  
HARTFORD 10  
CONN., U.S.A.

**PERFORATED METALS**



**INDUSTRIAL ORNAMENTAL**

**INDUSTRIAL ORNAMENTAL**

**ANY METAL ANY PERFORATION**

**The Harrington & King PERFORATING CO.**

5657 FILLMORE STREET—CHICAGO 44, ILL.  
Eastern Office: 114 Liberty Street, New York 6, N. Y.

**PRICES**

**Ferromanganese**

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk) ..... \$135.00  
Carload lots (packed) ..... 141.00  
Less ton lots (packed) ..... 148.50

Premium, \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

**Manganese Metal**

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.  
Carload, bulk ..... 36c.  
L.c.l. lots ..... 38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.  
Carload, bulk ..... 34c.  
L.c.l. lots ..... 35c.

**Spiegeleisen**

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

16-19% Mn 19-21% Mn  
3% max. Si 3% max. Si  
Carloads ..... \$35.00 \$36.00  
Less ton ..... 47.50 48.50

**Electric Ferrosilicon**

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si ....	6.65c.	7.10c.	7.25c.
75% Si ....	8.05c.	8.20c.	8.75c.
80-90% Si .	8.90c.	9.05c.	9.55c.
90-95% Si .	11.05c.	11.20c.	11.65c.

Spot sales add: .45c. per lb. for 50% Si, .3c. per lb. or 75% Si .25c. per lb. for 80-90% and 90-95% Si.

**Silvery Iron**

(Per Gross Ton, base 6.00 to 6.50 \$)  
F.o.b. Jackson, Ohio ..... \$29.50  
Buffalo ..... 30.75

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

\*OPA price established 6-24-41.

**Bessemer Ferrosilicon**

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

**Silicon Metal**

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

**Ferrosilicon Briquets**

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.25c.

**Silicomanganese**

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	6.05c.	6.70c.	6.90c.
2000 lb. to carload	6.70c.	6.90c.	6.90c.
Under 2000 lb.	6.90c.	6.90c.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb....	5.80c.	5.80c.	5.80c.
2000 lb. to carload	6.30c.	6.30c.	6.30c.
Less ton lots	6.55c.	6.55c.	6.55c.

**Ferrochrome**

(65-72% Cr, 2% max. Si)  
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

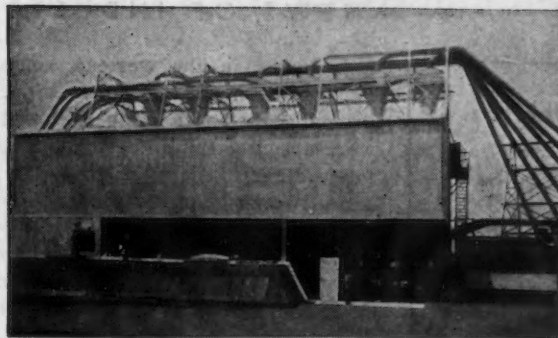
	Eastern Zone	Central Zone	Western Zone
0.06% C .....	23.00c.	23.40c.	24.00c.
0.10% C .....	22.50c.	22.90c.	23.50c.
0.15% C .....	22.00c.	22.40c.	23.00c.
0.20% C .....	21.50c.	21.90c.	22.50c.
0.50% C .....	21.00c.	21.40c.	22.00c.
1.00% C .....	20.50c.	20.90c.	21.50c.
2.00% C .....	19.50c.	19.90c.	21.00c.
66-71% Cr			
4-10% C ....	13.00c.	13.40c.	14.00c.



## PRICES

### Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/4 X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more...	\$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open Hearth	\$2.70
Crucible	\$2.80
Primus	\$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	\$1.50
Vanadium pentoxide, 88%-92% V <sub>2</sub> O <sub>5</sub> technical grade, contract basis, any quantity, per lb. contained V <sub>2</sub> O <sub>5</sub> . Spot sales add 5c. per lb. contained V <sub>2</sub> O <sub>5</sub>	\$1.10
Ferroboron, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.	
2000 lb. to carload	\$1.20
Under 2000 lb.	1.30
Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	\$7.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	\$2.25
Under 2000 lb. lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti.	\$1.23
Less ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload	\$112.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Sigs), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	4.6c.
Carload, bulk	
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.75c.
Ton lots	9.25c.



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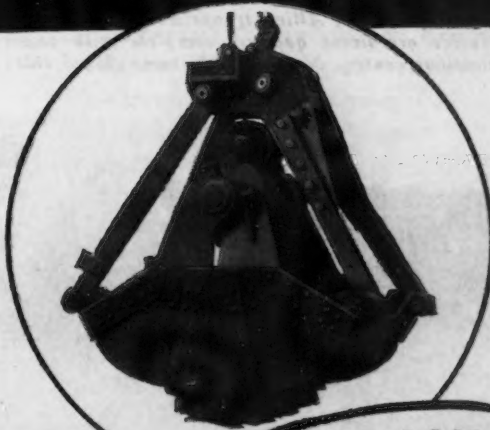
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## COMING EVENTS

- Sept. 10-13—National Metal Trades Association, Lake George, N. Y.  
 Sept. 25-27—Association of Iron and Steel Engineers, Pittsburgh.  
 Oct. 5-7—SAE National aircraft engineering & production meeting, Los Angeles.  
 Oct. 5-6—AIME Electric furnace steel conference, Pittsburgh.  
 Oct. 10-11—Gray Iron Founders' Society, Inc., Cincinnati.  
 Oct. 12-14—The Electrochemical Society, Inc., Buffalo.  
 Oct. 16-18—AIME Fall meeting, iron and steel division, Cleveland.  
 Oct. 16-20—American Society for Metals, Cleveland.  
 Nov. 2-3—Industrial Management Society, National Time and Motion Study Clinic, Chicago.  
 Nov. 27-Dec. 2—National Exposition of Power and Mechanical Engineering, New York.  
 Dec. 4-6—SAE National air cargo meeting, Chicago.

### Touring War Show To Depict Part Played By Steel in the War

#### Pittsburgh

••• An Army war show entitled "Steel Delivers the Punch," headed by the Industrial Services Division of the War Department, will play in some 10

mill towns in the western Pennsylvania-eastern Ohio areas in order to promote steel mill production, reduce work absenteeism, and provide a basis for the recruitment of help for the metal working plants in these districts.

About 250 Army personnel with about 50 vehicles such as armored cars, ducks, mobile searchlights, and various pieces of firepower equipment will take part in the show. It will consist of a series of dramatic sequences and end with a what was termed by War Department officials as the "Damndest battle ever created on a stage."

Beginning in Munhall for the Homestead-Munhall district on Aug. 21, the show will play in Braddock, Clairton, Charleroi, Weirton, Youngstown, Sharon, Aliquippa, Brackenridge, and Johnstown, ending the tour on Sept. 22.

The presentation is planned carefully to give spectators a good tabloid picture of how steel is used in the war, the importance of keeping fighting units supplied with sufficient equipment, and the potentialities of disaster to fighting units when equipment is not forthcoming. By so doing, it is hoped that production of plants in each of the districts will be improved and that the manpower shortages faced currently by all plants will be somewhat alleviated.

### Coke Ovens Started Recently

••• Coke ovens at the South Chicago DPC plant of Republic Steel Corp. were charged recently for the first time and the blast furnace was also blown in. The plant is an important cog in the sheet steel program, but the 32-in. mill has been running only one turn. Three of the four open hearths, which were originally intended for use in pre-refining alloy steel for the electric furnace portion of the plant are operating separately, the fourth being out because of labor shortage. Two of the nine electric furnaces are operating. The blast furnace, which has a 27-ft. hearth diameter, has a rated annual capacity of 450,250 tons.

### Protective Coatings For Aircraft Parts

(CONTINUED FROM PAGE 73)

plied. It is in general applicable to the following aluminum and aluminum alloys: 2S, 3S, 52S, 53S, 61S, and all Alclad alloys.

The process consists of an alkaline cleaning operation similar to that used for anodizing followed by a hot water rinse, chromodizing, final hot water rinse and a drying operation.

The parts are immersed in the alkaline cleaner for 5 min. with air agitation and are then subjected to a thorough rinse in hot water at a temperature of 160 deg. to 180 deg. F. This rinse should also be agitated and maintained at a pH of below 6.8 by additions of chromic acid, as required.

After the parts have been thoroughly cleaned, they are then immersed, for approximately 5 min. in a solution of 5 per cent chromic acid by weight, at a temperature of 120 deg. to 140 deg. F. The addition of a wetting agent (1.25 lb. of Aerosol OT per day or a 0.004 per cent solution in a 3800 gal. tank) is required to reduce surface tension.

Upon removal of the parts from the chromodizing treatment they should be subjected to a hot water rinse, at a temperature of 160 deg. to 180 deg. F. This rinse should contain sufficient chromic acid to maintain a pH value below 6.8. The parts, after chromodizing, must be thoroughly dried. This is generally done by means of a hot air oven at not over 180 deg. F. In some cases parts may also be dried by means of an air hose.

**ENEMY BLOCK HOUSE:** In St. Lo, France, Allied troops uncover this steel and concrete block house. Inside are living quarters complete with power plant and a modern communications center. Note cleverly camouflaged sides of house.

